Chassis and Car Body Maintenance Manual

Use of this manual

For the convenience of consulting, the chapter (section) titles and key headings are indicated on the top of each page in this manual.

To facilitate the location of maintenance items, an index is given on the first page of each chapter.

Precautions concerning all the maintenance operations in the current chapter are also given at the beginning of each chapter.

Please carefully read these precautions before any maintenance work.

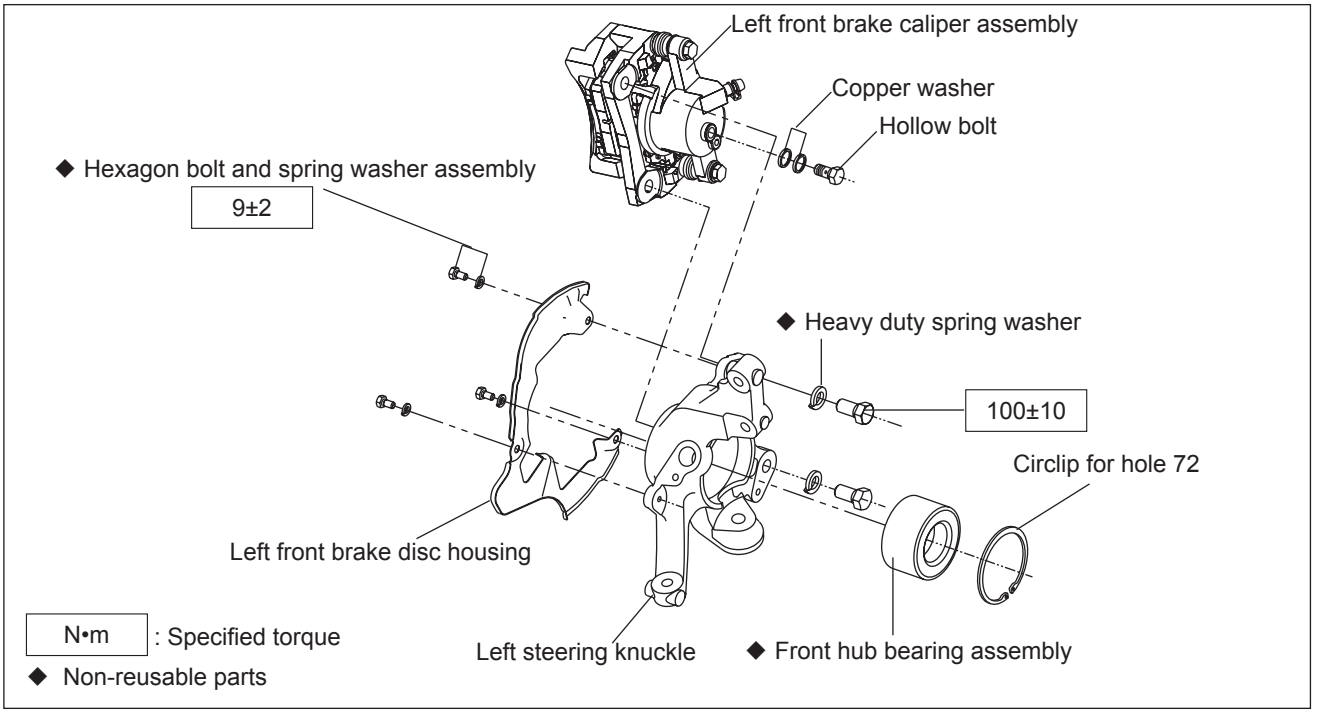
The fault diagnosis list of each system can help you diagnose the system faults and find out the causes.

In the column of repair method, the specific repair methods against the possible causes are provided, so that you can get the solution quickly.

Repair procedures

In most occasions, you can start your repair operation with the reference to the illustrations, which will help you recognize the parts and understand the mutual relation between them.

For example:



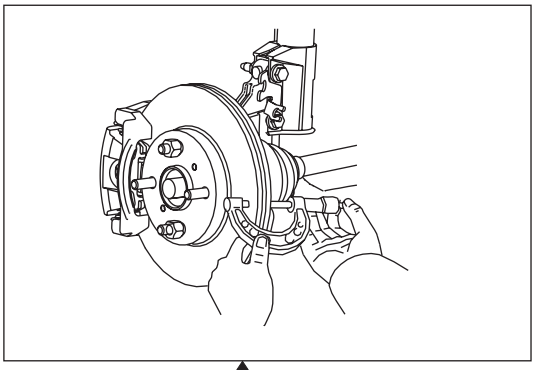


Illustration: What to do and where to do it

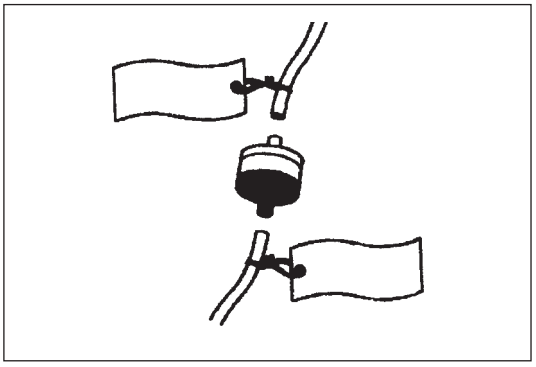
The repair procedure will be explained step by step:

- The illustrations show you what to do and where to do it.
- The title of repair work tells you what to do.
- The detailed description tells you how to complete the repair work and explains other related matters, such as the specifications and cautions, etc.

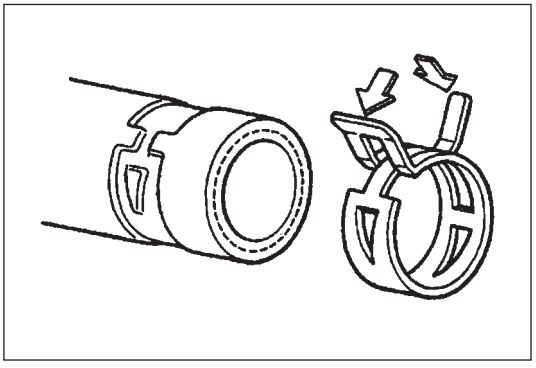
For example: Job title: what to do?

4. Check the thickness of the front brake disc.
Standard thickness: 22.0mm Specifications
Minimum thickness: 20.0mm
In case of the thickness less than the minimum value, please replace the brake disc.

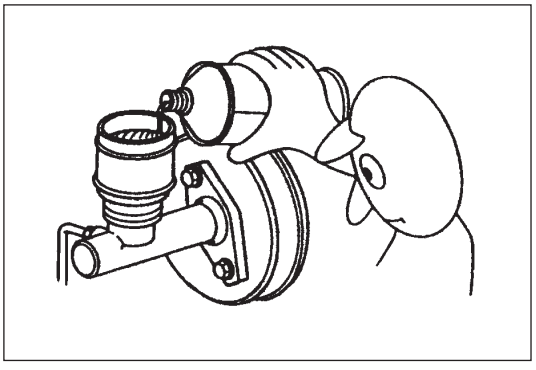
Detailed description: How to do it



(b) To facilitate the reinstallation, the hose after disconnected should be labeled for convenience of identification.
(c) After finishing these operations, one should carefully check and ensure that all the vacuum hoses are connected correctly.
(d) When applying vacuum meter, don't connect the hose to the excessively big fitting by force. The size of the fitting must be adjusted gradually. Bear in mind that there is a possibility of leakage if the hose is too expanded.



- Dismantling of the hose clip
  (a) Before disconnecting the hose, check the position of the hose clip, so as to ensure the correct reposition.
  (b) Replace those distorted clips or those with dent.
  (c) When reusing the original hoses, place the clip to the part with holding trace.
  (d) As for the spring clip, one could gently pull the spring in the direction of arrow to adjust the spring clip tight after the installation.



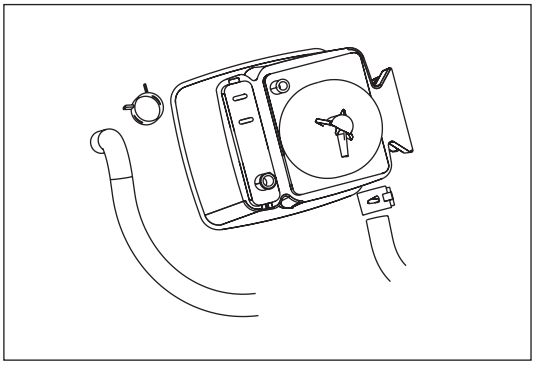
- Brake fluid and hydraulic element
  (a) Special care should be taken when adding fluid to the system, so as to prevent the dust and pollutant from entering the system.
  (b) Don't mix the fluid of different brands, for they are might undissolvable.
  (c) Don't reuse the brake fluid discharged.
  (d) For the brake fluid will damage the lacquer finish or resin surfaces, pay attention not to let the brake fluid spatter on the similar surfaces. If that is the case, flush them with water or warm water immediately. Plug opening after the brake hose or brake pipe is disconnected, so as to ensure that the brake fluid will not run down.
  (e) All parts removed must be cleaned with clean brake fluid and all the holes and passages should be purged with compressed air.
  (f) Prevent the parts removed from contacting the dust and friction materials carried in the air.
  (g) Before the assembly, please check and make sure all the parts are clean.
  (h) Unless otherwise specified, don't allow the oil or grease to be applied to the rubber parts or pipes.
  (i) During the assembly, one should check whether every part is correctly installed and whether every part works normally.

Instructions for electric trouble shooting

- Before trouble shooting
  (a) Check the fuses in the corresponding fuse/relay box.
  (b) Check whether the battery is damaged, whether it is in good charging state and whether it is clean, and tighten the connector.

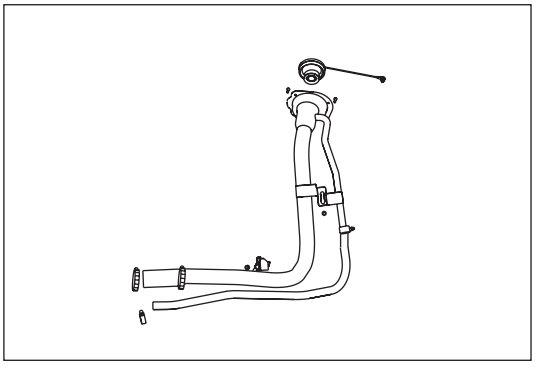
  Notice:

  (a) If the earth wire of the battery isn't disconnected, quick charge of the battery is prohibited; or else, the diode of alternator will be damaged.



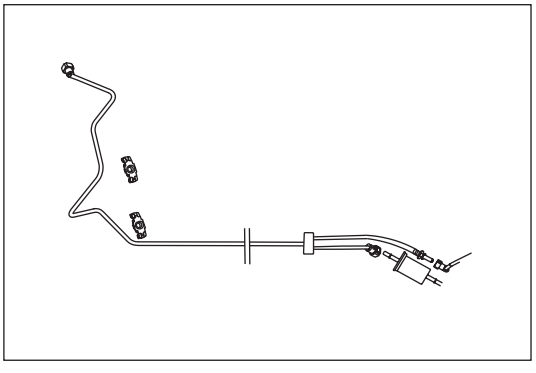
Dismantling and installation of charcoal canister

1. **First, clamp off the elastic hoop with a forceps, and then dismantle the two connecting hoses on the charcoal canister.**
2. **Pull out the charcoal canister upwards along its direction.**



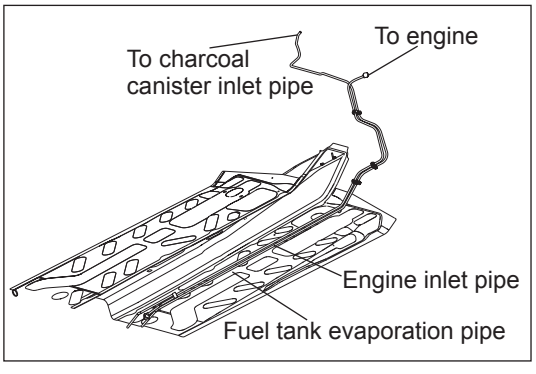
Dismantling of filler tube

1. **Dismount the tank cover and remove the four bolts at the oil filler lock.**
2. **Remove the two bolts for fixing the filler tube support and car body.**
3. **Remove the two elastic hoops for filler tube and tank connecting hose.**

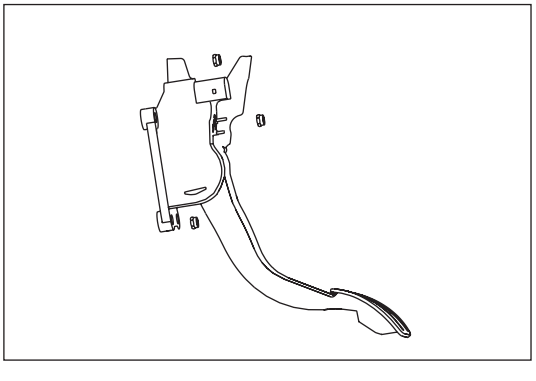


Dismantling of fuel pipe

1. **Dismount the connection between engine fuel guide inlet/return connectors and fuel pipe, and remove the snap fitting. Press button for the snap fitting manually and pull outwards.**
2. **Separate connection between fuel filter and fuel tank scavenge pipe, and pull it out from the pipeline clamping frame.**

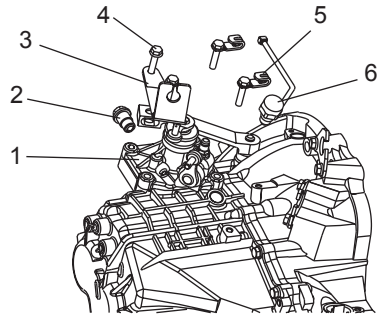


3. **Dismantling of evaporation pipe.**
   (a) Dismount the connecting elastic hoops at the both ends of the evaporation pipe, and remove the hose.
   (b) Pull out the evaporation pipe from the fixed seat for removal.



Dismantling of accelerator pedal

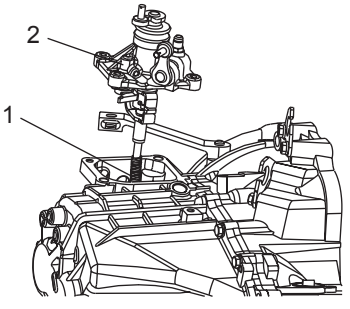
1. **Take off the electrical inserts**
2. **Remove the three nuts for fixing the pedal**



1. Assembly of operating box with selection lever/shifter
2. Shift ball positioner
3. Clutch throttle wire bracket
4. Bolt
5. Wire harness clip
6. Back-up lamp switch assembly

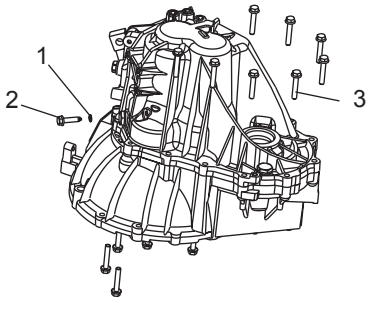
Steps for disassembling transmission

1. **After oil draining, place the transmission on worktable.**
2. **Unscrew the bolt connecting the operating box with the transmission case assembly, the shift ball positioner and the back-up lamp switch assembly, and remove the throttle wire bracket and the wire harness clip.**



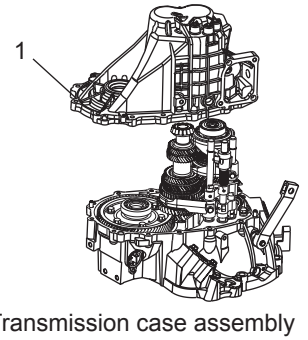
1. Shift returning small spring
2. Assembly of operating box with selection lever/shifter

3. **Extract the assembly of operating box with selection lever/shifter and take out the shift returning small spring.**



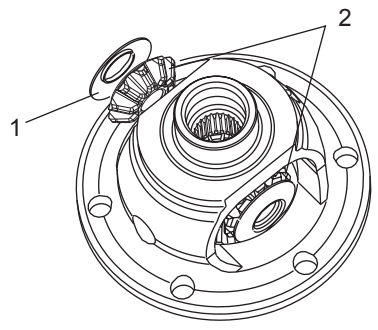
1. Seal ring - reverse idler
2. Reverse shaft fixed bolt
3. Bolt

4. **Remove the reverse shaft fixed bolt and the assembling bolt.**



1. Transmission case assembly

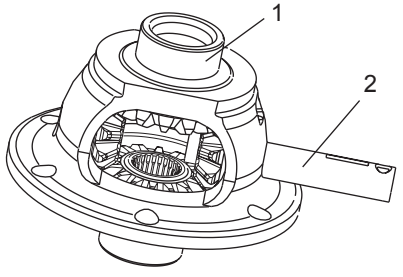
5. **Remove the transmission case assembly.**
   Notice: To avoid oil leakage, scratch is not allowed on the junction surface.



1 Shim for planetary gear
2 Planetary gear

2. Assemble the planetary gear.

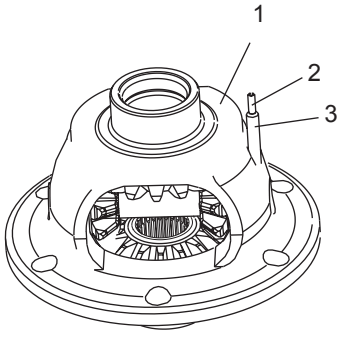
Place the planetary gears with shims between the two half shaft gears and then turn the two planetary gears simultaneously to make their holes in line with the two holes for installing planetary gear shaft on the differential housing.



1 Differential housing
2 Planetary gear shaft

3. Assemble the planetary gear shaft.

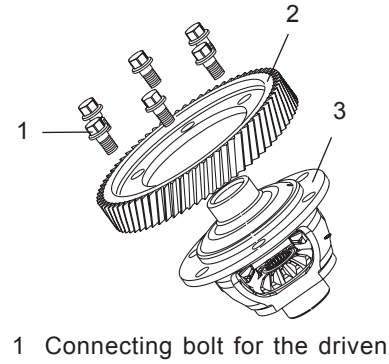
Make the planetary gear shaft through the two planetary gears and make the pin hole on it in line with the pin hole on the differential housing.



1 Differential housing
2 Elastic cylindrical pin 3X32
3 Elastic cylindrical pin 5X32

4. Assemble the anchor pin of planet shaft.

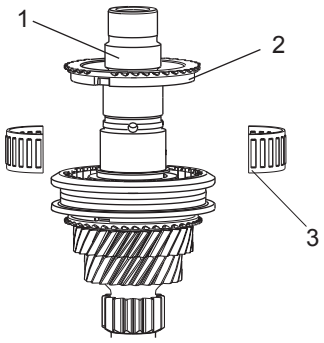
Knock in the anchor pin using the tooling H9 14 51506.



1 Connecting bolt for the driven gear of main retarder
2 Driven gear of main retarder
3 Differential housing

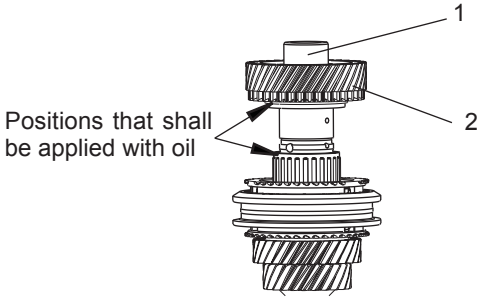
5. Install the driven gear of main retarder and its connecting bolt.

Put the driven gear of main retarder on the differential housing and align each hole with its seat. Then screw the connecting bolts for the driven gear of main retarder with tightening torque of 123.6 N•m.



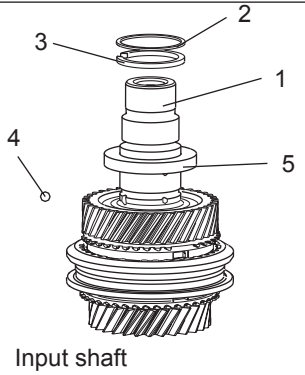
1 Input shaft
2 Fourth synchronizer ring
3 Fourth needle roller bearing

6. Assemble the fourth synchronizer ring and the fourth needle bearing.



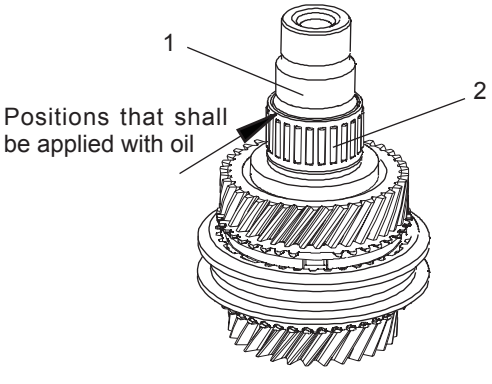
1 Input shaft
2 Fourth drive gear

7. Assemble the fourth drive gear assembly.
Notice: Before assembling, apply oil to the fourth gear pyramidal face and the needle bearing.



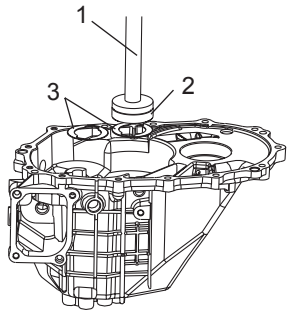
1 Input shaft
2 Fifth needle bearing shim
3 Snap ring for fifth thrust plate
4 Steel ball 5 Fifth thrust plate

8. Assemble the steel ball, the fifth thrust plate, the snap ring of fifth thrust plate as well as the fifth needle bearing shim.



1 Input shaft
2 Fifth needle roller bearing

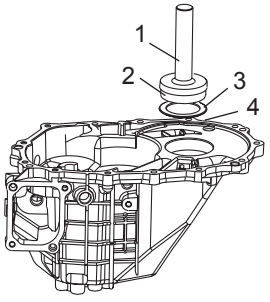
9. Assemble the fifth needle roller bearing.
Notice: Before assembling, apply oil to the needle bearing.



1 Tool H9 14 51700
2 Rear bearing cup of output shaft
3 Adjusting shim for input and output shafts

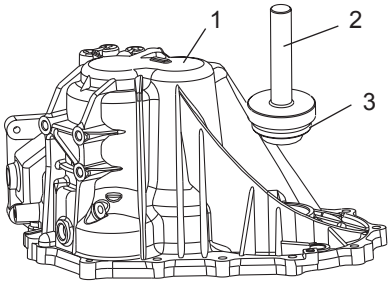
Installation of transmission case assembly

1. **Press the rear bearing cup of the output shaft in with the tooling H9 14 51700.**
   Notice: Before this, select the correct adjusting shim.



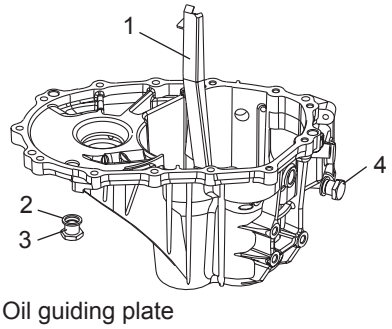
1 Tool H9 14 51000
2 Rear bearing cup of differential
3 Adjusting shim for conical bearing of the differential
4 Transmission case assembly

2. **Press the rear bearing cup of the output shaft in with the tooling H9 14 51100.**
   Notice: Before this, select the correct adjusting shim.



1 Transmission case assembly
2 Tool H9 14 50800
3 Rear oil seal of differential

3. **Press the rear oil seal of the differential in with the tooling H9 14 50800.**



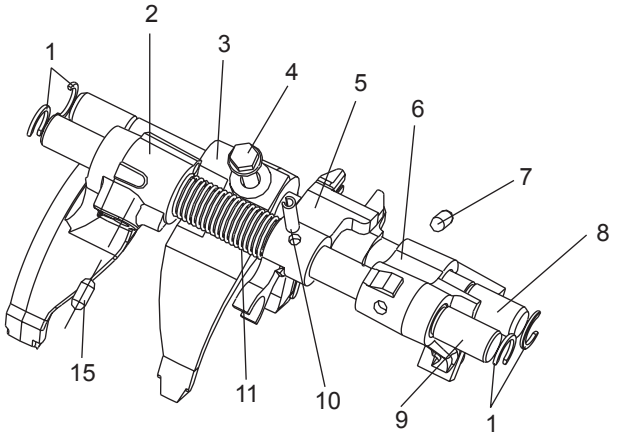
1 Oil guiding plate
2 Gasket
3 Oil intake plug
4 Oil inlet plug

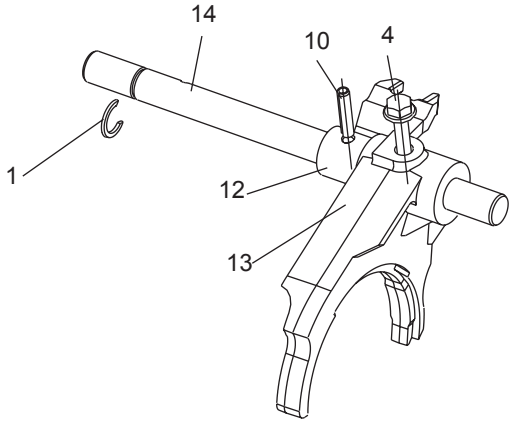
4. **Mount the oil guiding plate, oil inlet plug and drain plug. Tighten the oil inlet plug and the drain plug with torque of 15N•m.**

Maintenance of some common wearing parts

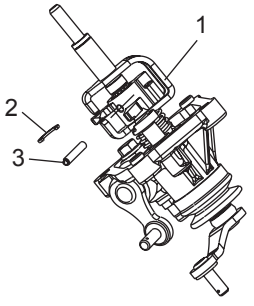
Maintenance of shifting yoke, guide block and fork shaft for each shift

1. **Dismantling of shifting yoke, guide block and fork shaft for each shift.**
   Maintenance of shifting yoke, guide block and fork shaft for each shift is simple: Tap the parts and the resilient pin of the declutch shift shaft out with tool H9 14 51506; remove the stopper used for each shaft with snap ring pliers; and screw off the locating bolt.
   Notice: The removed resilient pin and snap ring shall not be reused, and the new resilient pin and snap ring must be mounted. During dismantling, attention shall be paid to protection of shifting yoke face and guide block faces against damage.
2. **Installation of shifting yoke, guide block and fork shaft for each shift.**
   Maintenance and installation of shifting yoke, guide block and fork shaft for each shift are also simple: Place the parts at the correct positions; tighten the locating bolt and align the parts with the holes on the declutch shift shaft, and then tap the new resilient pin in with tool H9 14 51500.
   Notice:
   - During assembling, attention shall be paid to protection of shifting yoke face and guide block faces against damage.
   - It is required to apply the screw adhesive on the locating bolt before installation.
   - Check shall be conducted after assembling. Attention shall be paid not to missing assembling of long and short detents.





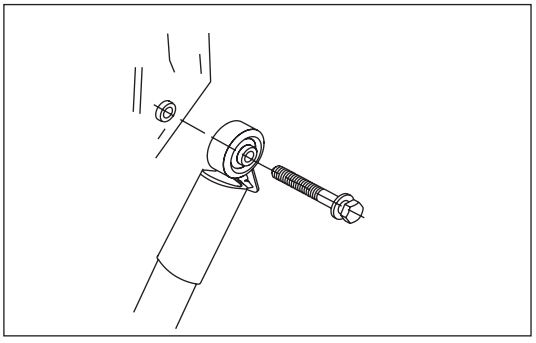
1 Axial stopperΦ12- declutch shift shaft
2 Fifth shifting yoke
3 Third-forth shifting yoke
4 Locating bolt
5 Guide block of fifth reverse shift shifting yoke
6 Reverse shift shifting yoke
7 Short detent
8 Third-forth declutch shift shaft
9 Fifth reverse shift declutch shift shaft
10 Resilient pin
11 Compression spring of fifth shifting yoke
12 Guide block of first-second shift yoke
13 First-second shift yoke
14 First-second declutch shift shaft
15 Long detent



1 Assembly of operating box with selection lever/shifter
2 Snap ring
3 Resilient pin

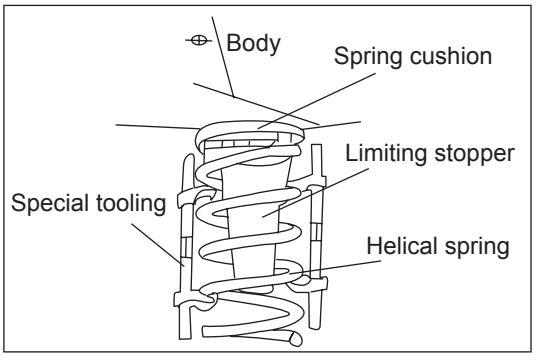
Maintenance of assembly of operating box with selection lever/shifter

1. **Dismantling of assembly of operating box with selection lever/shifter.**
   (a) Fix the assembly of operating box with selection lever/shifter with tool H9 14 51500, and tap the snap ring and the resilient pin out respectively with snap ring pliers and tool H9 14 51506.
   Notice: The tapped-out resilient pin shall not be reused, and new resilient pin needs to be mounted.



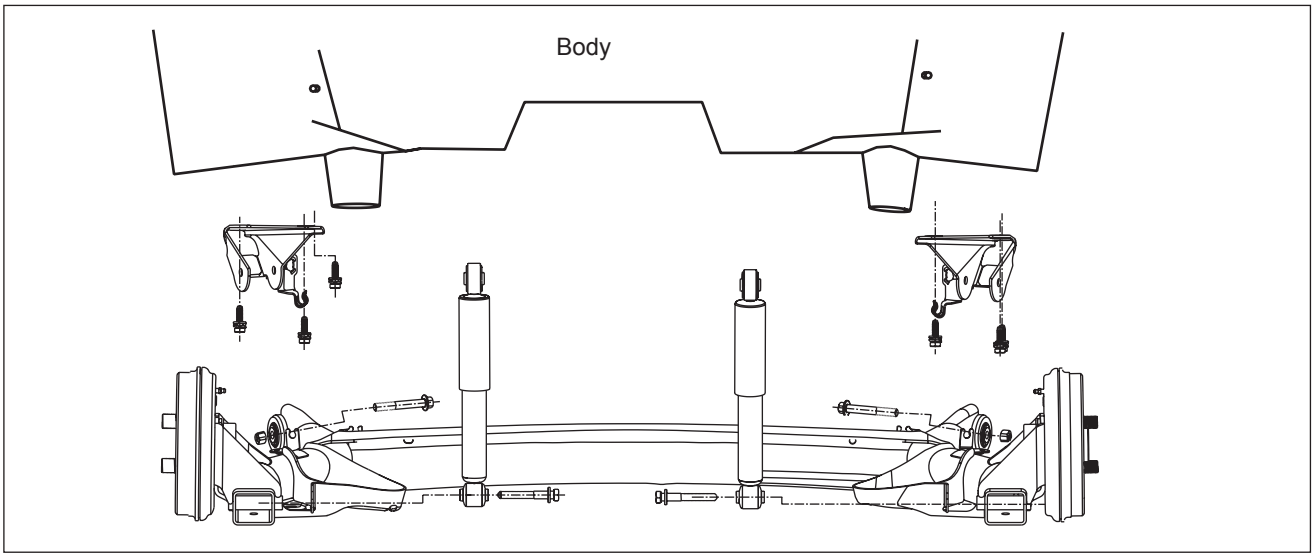
3. Dismantling the bolts on shock absorber assembly

Screw off the bolts jointing the upper side of the shock absorber and the body, using a M15 socket wrench.



4. Dismantling of helical spring, spring cushion and limiting stopper

Check springs for any damage and unacceptable elasticity; inspect them for deformations. Replace the defect springs timely. The replacement will do if the two have uniform labels. If a damaged spring, cushion or limiting stopper need replacement, please follow the sequence of step ①, step ② and step③ to dismantle and replace it.



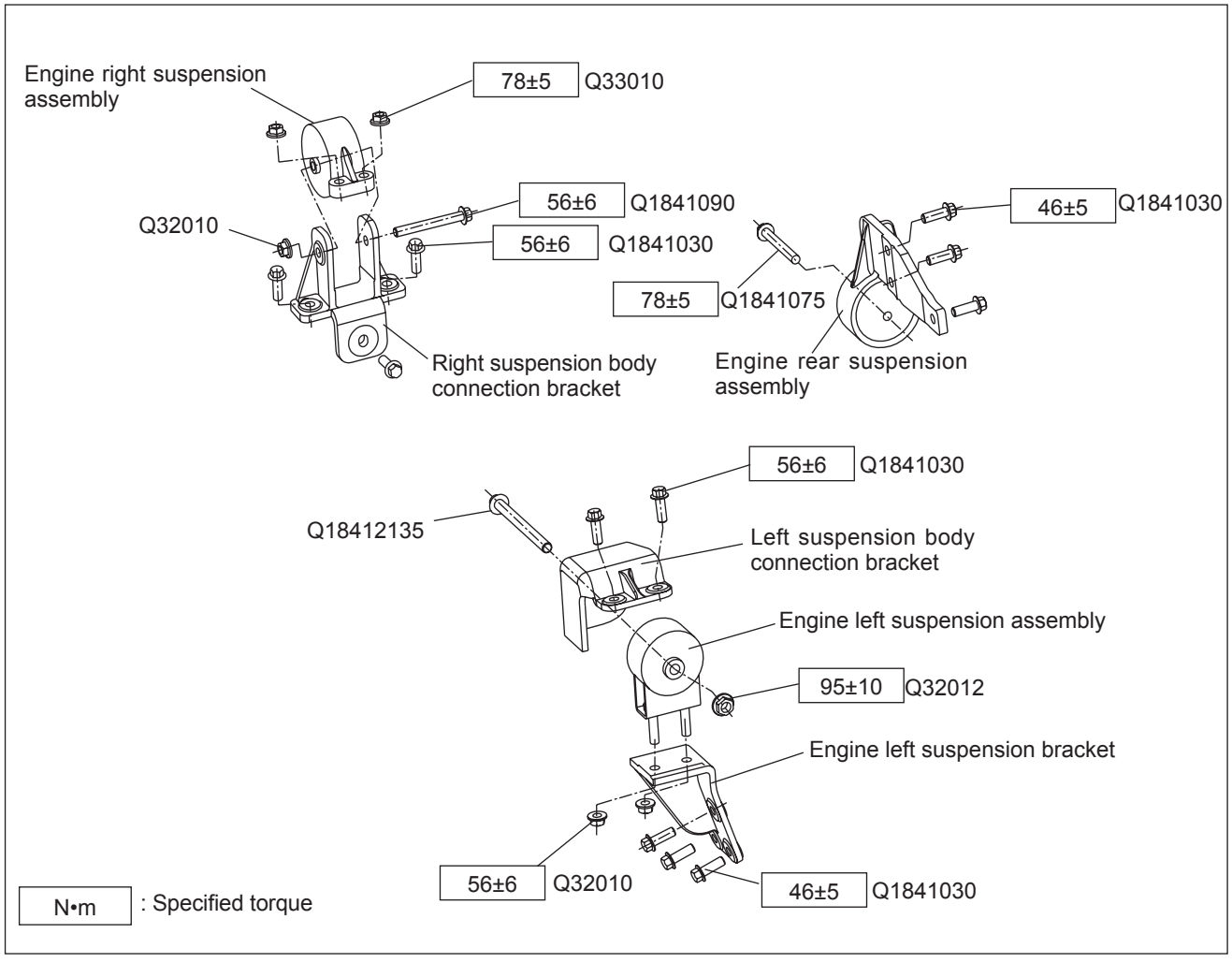
5. Dismantling of rear twist beam assembly, twist beam hanger and rear helical spring

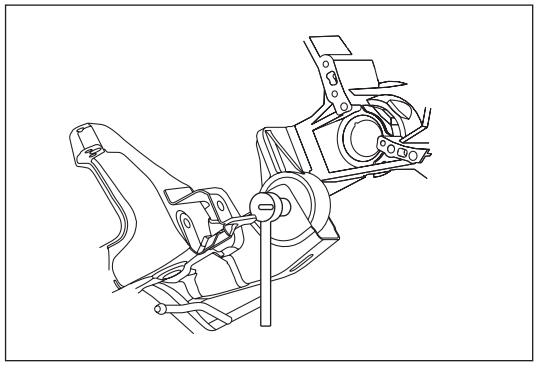
Dismantle brake oil pipe and hand brake cable before dismantling the twist beam and hanger.

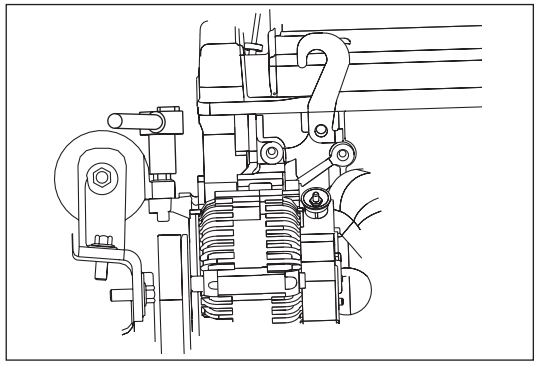
- Dismantle the twist beam from the body by dsmantling the 6 bolts binding the twist beam hanger and the body with a M16 socket wrench.
- Dismantle the twist beam hanger by fixing one end of the binding bolt with a M16 socket wrench and screwing off the latch nut with a M18 open-ended spanner.
- And then dismantle the bolts on the lower end of the rear shock absorber and dsmantle the shock absorber.

Suspension

Component diagram



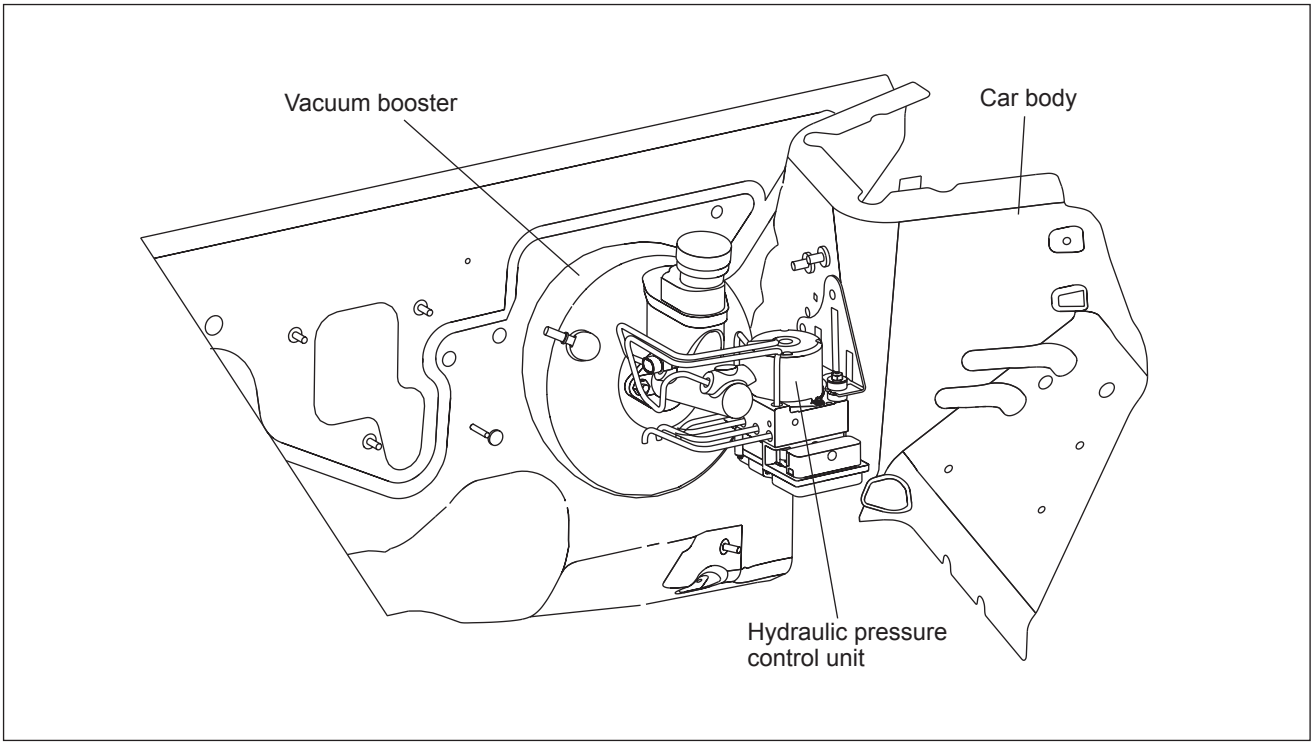




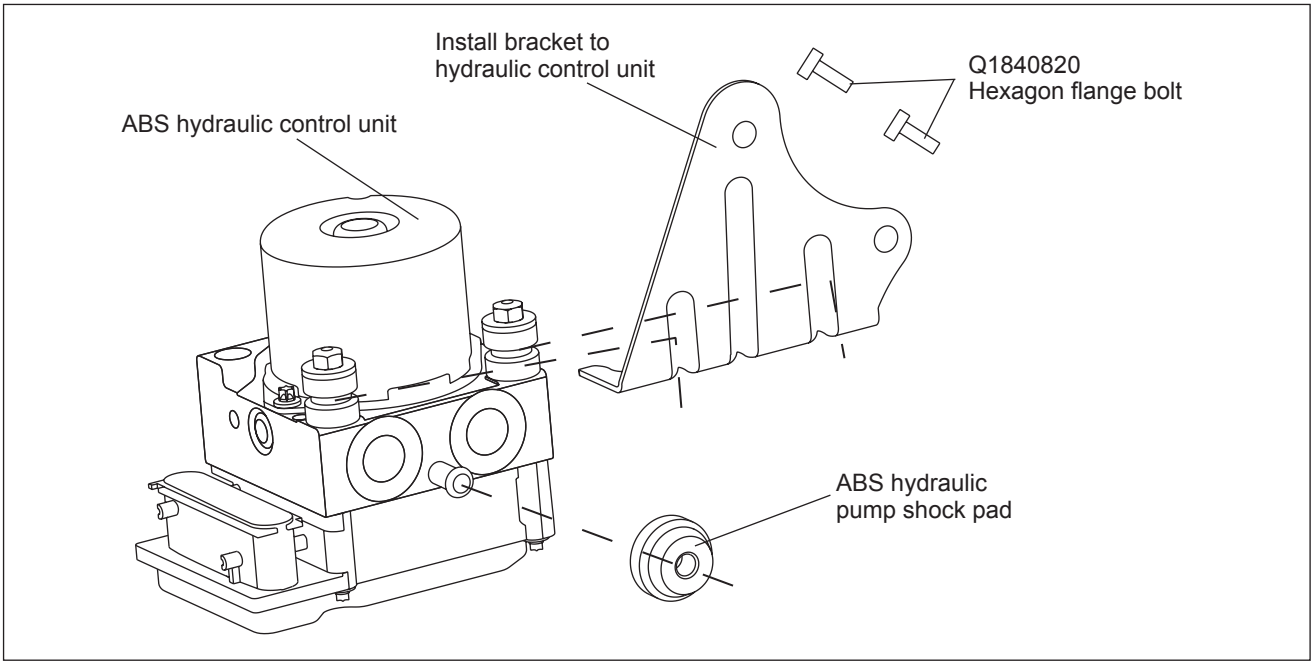
Dismantling procedure

1. **First suspend the engine with a crane, and then remove the engine by removing the bolts on rear suspension Q1841085, the 2 bolts on right suspension Q1841040, and the 2 bolts on left suspension Q32010 with a M13 sleeve, a M15 sleeve, a ratchet wrench and an extension rod.**

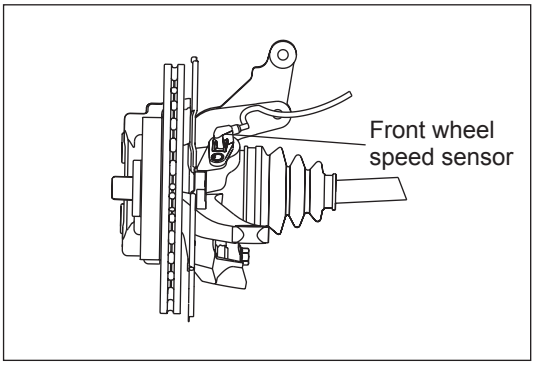
ABS assembly diagram

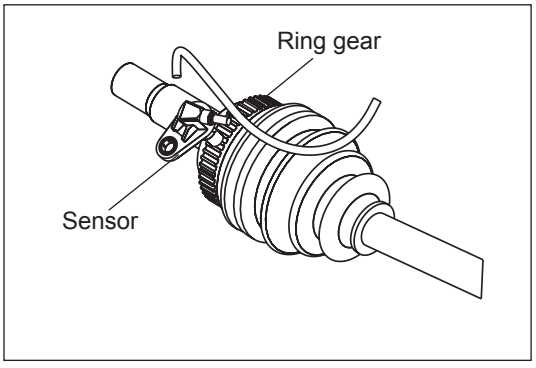


Installation mechanism sketch for ABS control unit



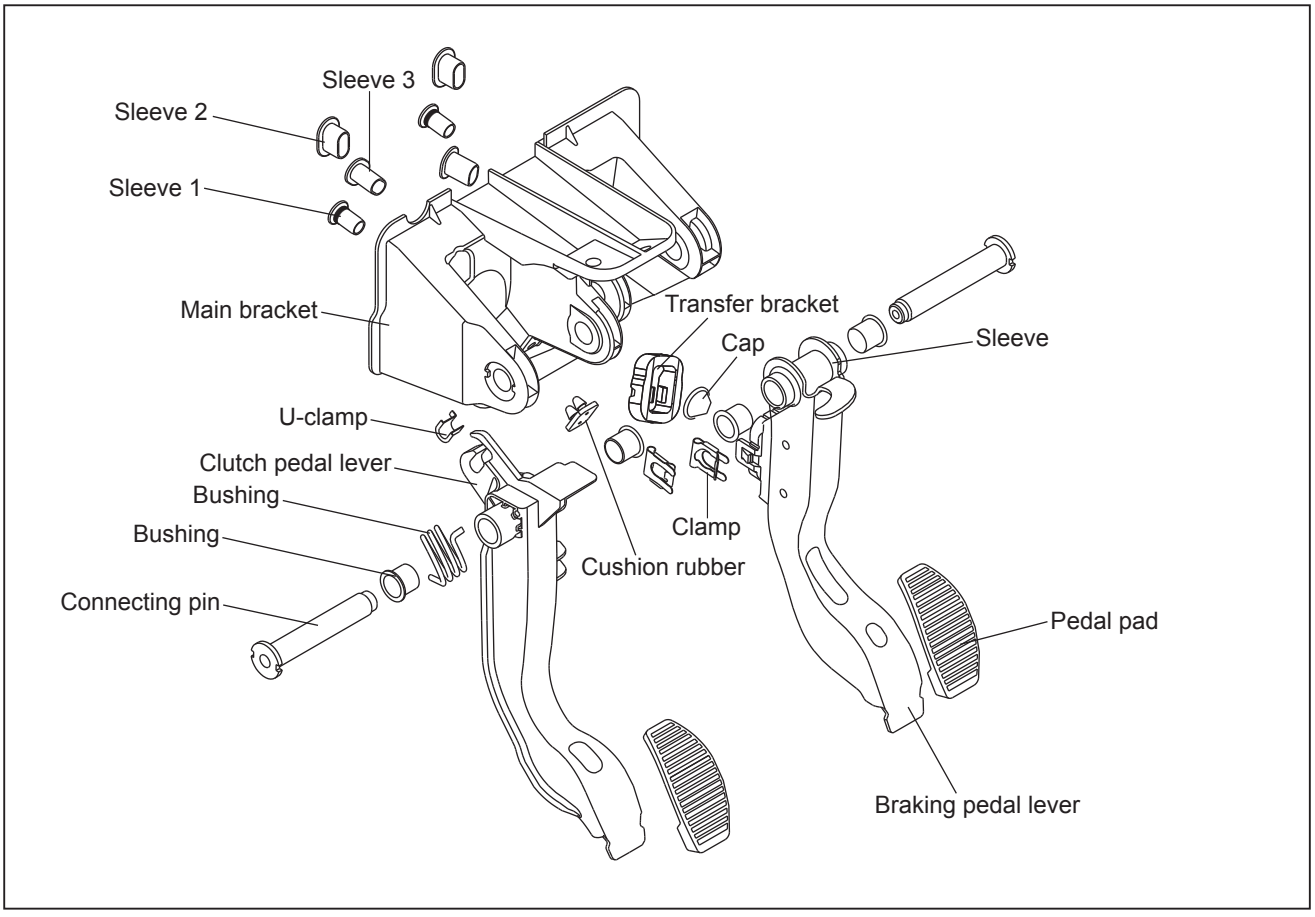
Installation position diagram for ABS wheel speed sensor (Front)





Clutch and braking pedal (Spring vehicle)

Component diagram



Notice

Handle each part and component gently during dismantling process of braking pedal and clutch pedal, to avoid damage, especially pay attention to the joint surface. Each part and component should be put in order, to avoid loss or being fetched by mistake.

Besides the above notice, the following should also be noticed when assembled:

1. **Bushing, connecting pin, clamp and pedal pad should not be reused once dismantled.**
2. **All components must keep clean, without dust, cuttings, rust, oil and other foreign substances.**
3. **Frictional surface with relative motion of all components must be covered with lubricating oil.**
4. **Press the connecting pin vertically.**
5. **Snap ring of spring should rotate freely after assembled in position.**
6. **Be careful of injury by spring-rebound when release spring of clutch assembled.**

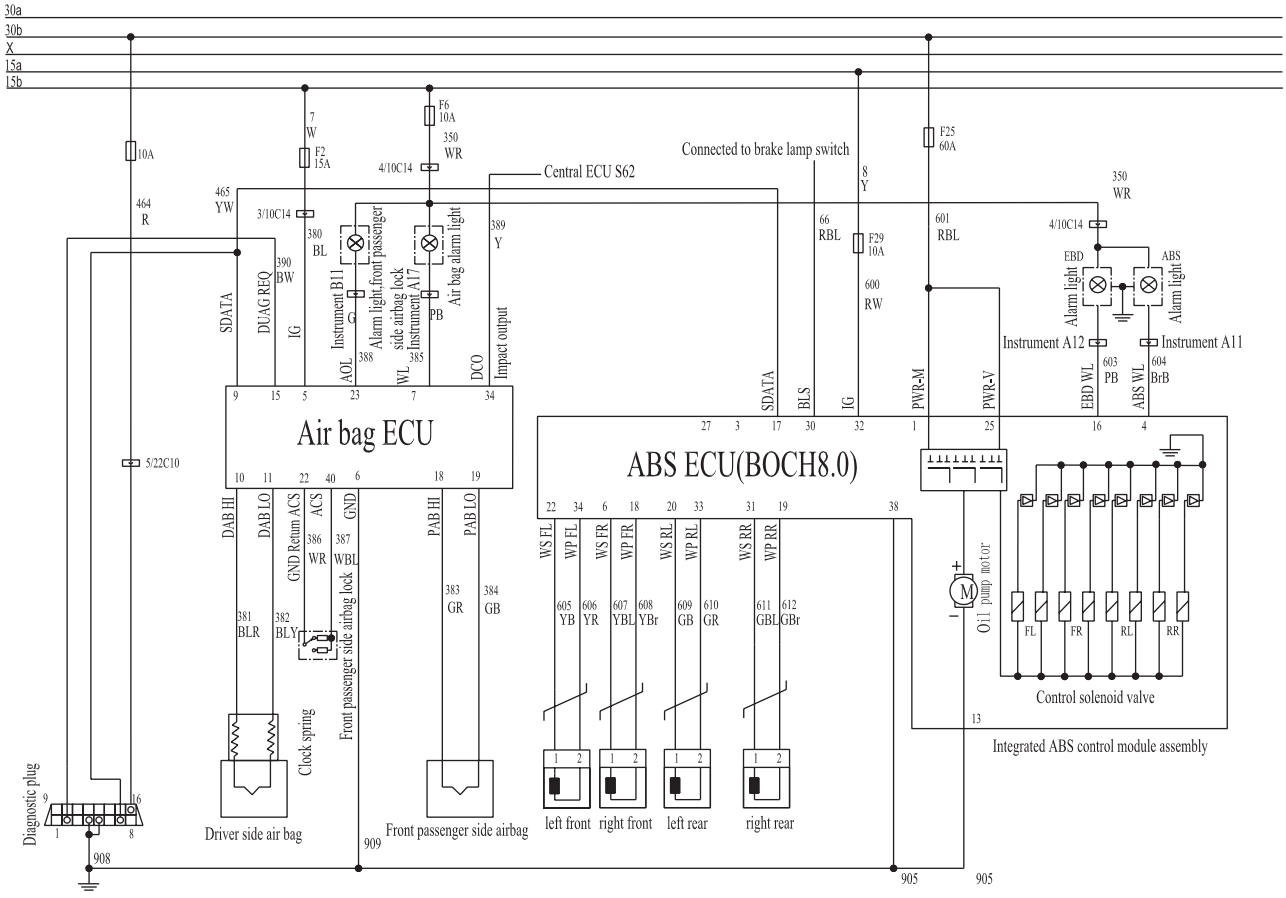
Troubleshooting

Failure phenomena	Possible reasons	Solutions
Clutch pedal can't return	Spring fractures	Replace spring
	Fixed end of spring falls off	Check, fix in position
Clash or being hard to operate by foot when clutch pedal is trodden	Cushion rubber is broken or falls off	Replace cushion rubber
It's slippery to tread pedal by foot	Pedal pad is broken or falls off	Replace/install again
There's unusual noise when pedal is trodden	Bushing or connecting pin is badly worn out	Replace
	Spring fractures	Replace
	Fixed end of spring falls off	Check, fix again

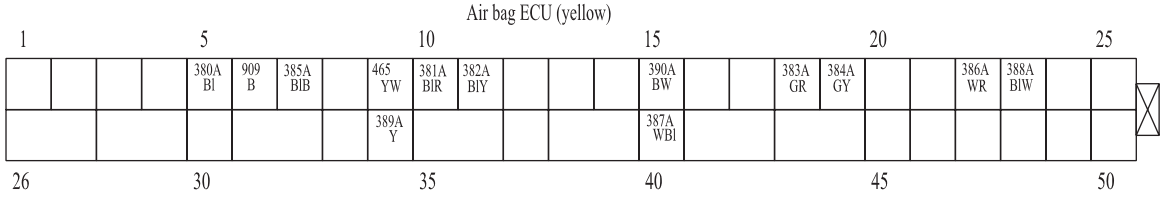
Troubleshooting

Fault	Cause	Remedy
Excessive free play of steering wheel/abnormal knocking	(1) Excessive clearance between gears and rack of steering gear. (2) Wearing of inner and outer ball studs of steering tie rod. (3) Wearing of steering universal joint. (4) Loose of connection between steering propeller shaft and steering gear. (5) Loose of connection between steering wheel and steering column. (6) Loose of mounting bolt of steering gear. (7) Wearing and loose of lower drive shaft sliding spline.	(1) Adjust the clearance by professionals. Replace steering gear when adjustment fails. (2) Check and confirm and then replace ball stud when necessary. (3) Replace the lower part of steering column. (4) Tighten the bolt again according to the specified torque. (5) Tighten check nuts of steering wheel; when spline is damaged, replace steering wheel or steering column. (6) Tighten mounting bolts of steering gear. (7) Replace the lower part of steering column.
Heavy Steering	(1) Low tyre pressure. (2) Incorrect front wheel alignment. (3) Insufficient clearance for the block of steering gear. (4) Damage of cross bearing of steering column. (5) Lack of lubricant or damage of ball stud of steering tie rod. (6) Damage of upper mounting bearing of the front shock absorber. (7) Damage of ball stud of the lower swing arm. (8) Insufficient output flow and output pressure caused by damage of power steering pump. (Hydraulic power steering system) (9) Slipping of belt of power steering pump. (Hydraulic power steering system) (10) Excessive internal leakage of power steering gear. (Hydraulic power steering system) (11) Bulb in power steering fluid companied with abnormal knocking.(Hydraulic power steering system) (12) Insufficient power steering fluid.(Hydraulic power steering system)	(1) Charge in accordance with specified air pressure. (2) Check and adjust front wheel alignment angle. (3) Replace steering gear or adjust the clearance for blocks by professionals. (4) Replace lower part of steering column. (5) Replace steering tie rod ball stud. (6) Replace connecting assembly of upper mounting of the front shock absorber. (see the section of maintenance of front suspension) (7) Replace lower swing arm (see the section of maintenance of front suspension) (8) Replace power steering pump. (9) Adjust tension of belts. (10) Replace power steering gear. (11) Operate the steering gear repeatedly in the same place to exhaust bulb. After standstill one hour, feeding specific model power steering fluid. (12) Add power steering fluid of specified model until it reaches the specified scale of oil reservoir.
Poor steering returnability Poor straight-driving stability	(1) Low tyre pressure. (2) Error in dynamic wheel balancing caused by fall-off of wheel weight. (3) Aging of rubber bushing of lower swing arm; excessive difference of the right and the left rigidity. (4) Lack of lubricant on upper mounting bearing of the front shock absorber and ball stud of the lower swing arm. (5) Incorrect parameters of wheel alignment. (6) Excessive backward drag caused by deteriorating of rack and pinion meshing of steering gear. (7) Damage of steering column bearing and cross bearing. (8) Insufficient fuel delivery of power steering pump.(Hydraulic power steering system) (9) Degradation of performance of internal control valve steering gear. (Hydraulic power steering system)	(1) Charge in accordance with specified air pressure. (2) Readjust dynamic wheel balancing. (3) Replace lower swing arm. (4) Fill grease of specified model. (5) Measure and adjust parameters of wheel alignment again. (6) Replace steering gear. (7) Replace steering column assembly. (8) Replace power steering pump. (9) Replace power steering gear.

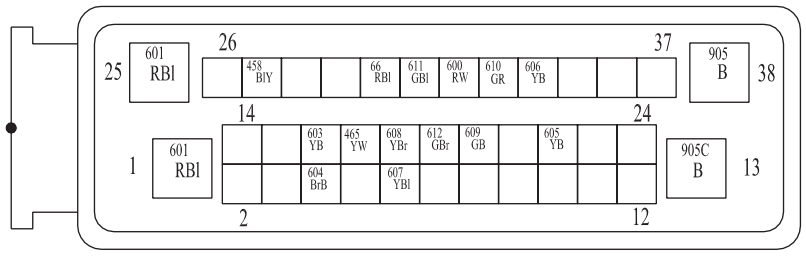
Airbag, ABS



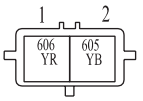
Air bag ECU (yellow)



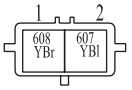
ABS-ECU



ABS-FL sensor



ABS-FR sensor



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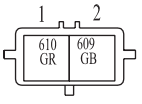
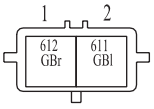
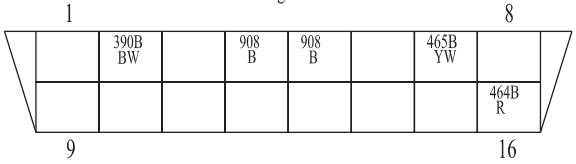


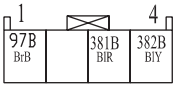
ABS-FR sensor



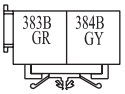
Connected to diagnostic tester



Clock spring A



PAB generator (yellow)



Air bag switch