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Overview

I. Warnings and Precautions

(I) Warnings and Precautions

The definition of "Warning", "Important Notes" and "Caution"

The diagnostic and repair procedures in the service manual including the general and specific nature of the two "Warning", "Important Notes" and "Caution", JAC provides maintenance information to help service technicians to diagnose and repair, so that the vehicle can normally work, however, if the technician is not operated by the recommended method, which may cause unpredictable hazards to the technicians and the vehicle.

"Warning", "Important Notes" and "Caution" is prepared to prevent the above said danger, but not all were able to foresee. Such information is located in a prominent position in the service manual and prepared to prevent the types of information listed as follows:

- Cause serious injury to personnel
- Damage to the vehicle
- Unnecessary vehicle maintenance
- Unnecessary parts replacement
- Improper vehicle parts repair or replacement

The definition of "Warning"

When encounters "Warning", indicates to take the necessary measures or measures forbidden. If ignore the "Warning" could lead to the following consequences:

- cause serious injury to personnel
- If the vehicle is not repaired properly, cause the driver and / or passenger serious injury.

The definition of "Important Notes"

"Important Notes" requires special attention to the necessary measures or measures forbidden. If ignore the "Important Notes", will result in the following consequences:

- Damage to the vehicle
- Unnecessary vehicle maintenance
- Unnecessary parts replacement
- The maintained operation or performance of the components and system not normal
- Damage to related systems or components
- Damage to fasteners, basic tools or special tools
- Engine coolant, lubricating oil or other major oil leak

The definition of "Caution"

"Caution" the statement to stress the need for a diagnostic or repair procedure, the purpose of "Caution" statement is as follows:

- Clear procedures
- provide additional information for the completion of a program
- clarify the reason of the recommended program operation
- provide a more effective way to complete the process of information
- provide past experience information to the technician in order to more easily complete the process

Warning about the lifting of a vehicle

△ Warning To avoid vehicle damage, serious personal injury or even fatality, when remove the main part from the vehicle and use lift as support, jack should be used as support to stand the corresponding to be demolished parts of the vehicle.

Warning on handling anti-lock braking system components

△ Warning certain parts alone in anti-lock braking system (ABS) cannot be repaired, disassemble or attempt to disconnect some of the system components can result in personal injury and / or system function abnormal. Only repair those components with permission to remove and install.

Warning about collision repair licensed device

△ WARNING avoid personnel injury caused by exposing to welding arc or plating (zinc oxide) metal toxic fumes when grinding / cutting any type of metal or sheet molding. Repair work had to be done in a well-ventilated area and wear approved respirator, goggles, earplugs, welder gloves and protective clothing.

Warnings about driving assistant

△ WARNING when repair technician checking the fault position, the vehicle should be driven by the assistant or it may result in personal injury.

Warning about battery disconnecting

△ WARNING Before maintaining any electrical components, the ignition key must be in the OFF or LOCK position, and all electrical loads must be "OFF ", unless the procedure stated otherwise. If the tool or device is easy to expose to charged electrical terminals, thus further disconnect the negative battery cable is needed. Violation of these safety instructions could result in personal injury and / or damage to the vehicle and vehicle parts.

△ WARNING if removing and installing airbags needed, disconnect the negative battery at least 90s, then carry out dismantling work.

Warning about brake dust

When maintaining the wheel brake components, the following is not allowed:

- grinding the brake linings.
- sanding the brake linings.
- Use a dry brush or compressed air to clean the wheel brake components.

△ Warning some models or some installed brake parts after sales models may contain fibers, which may mix with dust, inhalation of dust containing the fibers can cause serious injury to human body, which makes it necessary to use a damp cloth to clean any dust on brake parts before maintenance.

Warning about brake fluid

Δ **WARNING** Brake fluid can easily absorb wet and moisture, do not use brake fluid in open container, which may be polluted by water, the use of improper or contaminated brake fluid may result in a system failure, loss of vehicle control and personal injury.

Warning about the irritating of brake fluid

Brake fluid has irritation to skin and eye. Once touched, should take the following measures:

- Eye contact - rinse thoroughly with water
- Skin contact - wash with soap and water

Warning about the brake pipe replacement

Δ **WARNING** Please be careful with fixation and installation when replacing the brake pipe and be sure to use the correct fasteners, otherwise this may cause damage to the brake hose and brake systems and causing bodily harm.

Warning about the clutch dust

Δ **WARNING** When servicing clutch parts, do not grind or sand the clutch plate, and do not use a dry brush or compressed air to clean parts, because which operation will generate dust. Use a damp cloth moistened with water (but do not soak). Clutch plate may contain fiber, if generating dust during the repair process, these fibers will mix with air. Inhalation of dust containing the fibers can seriously harm human body.

Warning about the collision cut

Δ **WARNING** recommends only to do parts of the cut, otherwise it will destroy the integrity of the structure of the vehicle, and vehicle collision can cause human injury.

Warnings about eye protection

Δ **WARNING** In implementing this program, wearing licensed goggles and gloves to reduce the risk of injury.

Warning about the moving parts and hot surfaces

Δ **WARNING** when working around a running engine, avoid contact with moving parts and hot surfaces to avoid personal injury.

Warnings about the goggles and gloves

Δ **WARNING** be sure to wear goggles and gloves when disassemble exhaust system parts, or the falling rust and sharp edges from parts of the exhaust system can cause serious personal injury.

Warnings about removing reservoir cap

Δ **WARNING** to avoid burns do not remove the reservoir cap before the engine is cool. Removing the reservoir cap if when the engine and radiator are not cooled, the cooling system will release scalding liquid and high-pressure steam.

Warning about the cooling system maintenance

Δ **Warning** as long as there is pressure in the cooling system, even if there is no boiling solution in the radiator, the temperature of the solution will be much higher than boiling water. If open reservoir cover and perform maintenance on the cooling system when the engine is not cooled and under conditions of high pressure, engine coolant could boil and immediately spray onto the operator body leading to serious burns.

Warning about road test

△ Warning In the premise of ensuring safety and road test vehicle should comply with all traffic laws, do not try anything that might jeopardize the operation of vehicle control, a breach of the safety instructions can cause serious injury and damage to vehicles.

Warnings about the goggles and fuel

△ Warning when handling fuel, be sure to wear goggles to prevent fuel splashed into eyes.

Important note about brake system brake fluid filling

△ Important note: When you add brake fluid to the master cylinder reservoir tank, use brake fluid only in clean, sealed brake fluid container and in line with DOT4. Not use the recommended brake fluid can lead to pollution, causing damage to the hydraulic brake system components inside the rubber seal and / or a rubber gasket.

Important note about brakes

△ Important Note: When removing the brake, use a wire to hang brakes to avoid damaging the brake pipe.

Special considerations about the affection of brake fluid on paint and electrical components

△ Important Note: Avoid brake fluid splashing on paint, electrical connectors, wire or cable, which will damage the paint and cause corrosion of electrical components, if the brake fluid exposed to the paint, wash the contact sites with water immediately, if the brake fluid contact with electrical connectors, wires or cables wipe it with a clean rag.

Important note about fasteners

△ Important Note: Please use correct fasteners in the correct location, fastener replacement part number must be correct, there is maintenance procedures in particular when requires to replace a fastener or use a threaded fastener locking glue or sealant, do not use paint, lubricating oil or corrosion inhibitors on the fastener or fasteners connecting surface, unless otherwise indicated. These varnishes affect fastener torque and clamping force, and may damage the fastener. When install the fasteners, be sure to use the correct tightening sequence and torque to avoid damage to the components and systems.

Important note about do not twist or bend hoses during installation

△ Important note: The inlet and outlet hose must not be twisted during installation, even to the convenience of easily installation, as this may cause damage to the parts.

Important note about damage to machine surface

△ Important note: Do not nick, scratch or damage to the sealing surface, the sealing surface is machine surface, damage which can cause leakage.

Important note about ring dismantle

△ Important Note: Do not pry the ring gear from the differential housing, pry the ring gear from the differential housing may cause a ring gear and / or damage to the differential housing.

Important note about sealant

△ Important note: Do not let the room temperature curing sealant into the threaded blind hole, if so, it will have hydraulic locking effect when tightening fasteners, a hydraulic locking fastener will cause fasteners

and / or other component damage, what's more, the fastener cannot get the correct clamping force when tightening, which will lead to improper seal and cause leakage. The firmware cannot properly tighten; it will cause parts loosening or separating, and damage the engine severely.

Important note about steering wheel turning to the extreme position

△ Important Note: The duration of the steering wheel turning to the extreme position should not exceed 5s; otherwise it may damage the steering motor.

II. Vehicle inspection

(I) Vehicle check items during operation

Tire, vehicle and position operation

Be alert when steering wheel or seat vibration occurs at normal highway speeds, which could indicate a need to balance the wheels, in addition, if running deviation on the flat road may indicate the need to adjust the tire pressure or wheel alignment.

Steering operation

Be alert when change steering operation, when the steering wheel turning is difficult or its free travel is too large and abnormal sound during turning or parking, it need to be checked.

(II) Items to be checked at least once a month

Tires, wheels and pneumatic inspection

Check the tires for abnormal wear or damage and whether the wheel is damaged, check the tire pressure before running, spare tire included, to maintain the recommended tire pressure label.

Oil leak check

If the vehicle parked a certain time, regularly check to see whether there is water r, engine oil, fuel or other liquids on the ground under the vehicle. Dripping from air conditioning system after use is normal, if fuel leak or smoke, find the cause and fault diagnosis should be carried out right away.

(III) Items to be checked at least twice a year

Brake master cylinder reservoir level

Check the fluid and keep a proper level, low level may indicate a brake pad or worn of brake lining, in which case repair is needed, check the tank vent cover to ensure airway patency and with no dirt.

Clutch pedal free travel

Check the clutch pedal free travel and adjust if necessary. Refer to clutch pedal free travel adjustment.

Doors and windows sealant lubrication

Seal coated with silicon grease film with clean rags.

III Vehicle lifting

(I) Vehicle lifting

Refers to "Warnings and Important Notes" in the "warning about vehicle lifting." To avoid personal injury,

when use jack to support the vehicle or any work under the vehicle, be sure to use the jack stand.

Vehicle lifting point

△ Note Rear lifting machine block can't meet the threshold plate to the side frame rails or floor.

Put rear lifting machine block in the following locations: under the connection between the rear frame rails and side frame rails.

△ Note Front lifting machine block can't meet the threshold plate to the side frame rails or floor. Put front lifting machine block in the following locations: under the connection between the front frame rails and side frame rails.

IV Maintenance

(I) Standard

Main liquid parameters

Name	Brand	Capacity
unleaded gasoline	unleaded gasoline at least 93	42L
1.3L engine coolant	50% ethylene glycol	5.5L
1.5L engine coolant	50% ethylene glycol	6L
Transmission lubricating oil	SAE.75W-90	2.0L
Engine Oil	SAE10W-30 SJ or above	4L
Air conditioning refrigerant	PAG56	0.12L
Brake fluid	DOT4	650ml ±50ml
Air condition coolant	R134a	520g ±20g
Washing liquid	NC310-c	4L

Power indicators

Project	Unit	1.5 5MT	1.5 CVT
Continuous shift start acceleration time (0-100km / h)	S	≤15	≤14
Direct gear acceleration (80-120Km / h)	S	≤26	≤11
Maximum speed	Km/h	≥180	≥170
Maximum grade ability	%	≥30	≥30

Fuel economy indicators

Item	1.5 5MT	1.5 CVT
Integrated/km)	≤6.1	≤6.8
90km/h constant speed (L/km)	≤4.9	≤5.5

Transmission gear ratio

Operational method	Remote operation
--------------------	------------------

Rated input torque		200 N m
Model		MF70B22
Ratio	Gear 1	3.769
	Gear 2	2.053
	Gear 3	1.393
	Gear 4	1.031
	Gear 5	0.778
	Reverse gear	3.25
	Final ratio	4.056

Front and rear wheel maintenance parameters and location parameters

Item			Parameters
Tire pressure (cold)			220 ±10KPa
Tire size (1.5 5MT models)			205/55 R16 94V
Tire size (1.5 5CVT models)			205/55 R16 94V
Wheel run out	Radial	steel wheels	1.0mm
		aluminum wheels	0.3mm
	Axial	steel wheels	1.0mm
		aluminum wheels	0.3mm
Item			Parameters
Location parameters	Front tire	front wheel toe Angle	3.75'±6.75'
		front-wheel camber	24'±30'
		kingpin inclination angle	10.5 °±1 °
		kingpin caster angle	3.65 °±0.75 °
	Rear tire	The rear toe Angle	24'±24'
		The rear wheel unilateral toe	12'±12'
		The rear wheel camber	-56'±30 '°

(II) Regular maintenance instructions

Vehicle normal maintenance schedule

Maintenance item is given for the vehicle assumed for the following purposes:

To transport restrictions passengers and cargo indicated by the tire label located in the edge of the driver's door. Travel within the statutory limit and on the appropriate operating road.

Planned maintenance item instructions

Detailed maintenance items listed in the maintenance schedule as below: in the implementation of the following maintenance item, be sure to replace all the parts and complete all necessary repairs before driving, and be sure to use the proper fluid and lubricants.

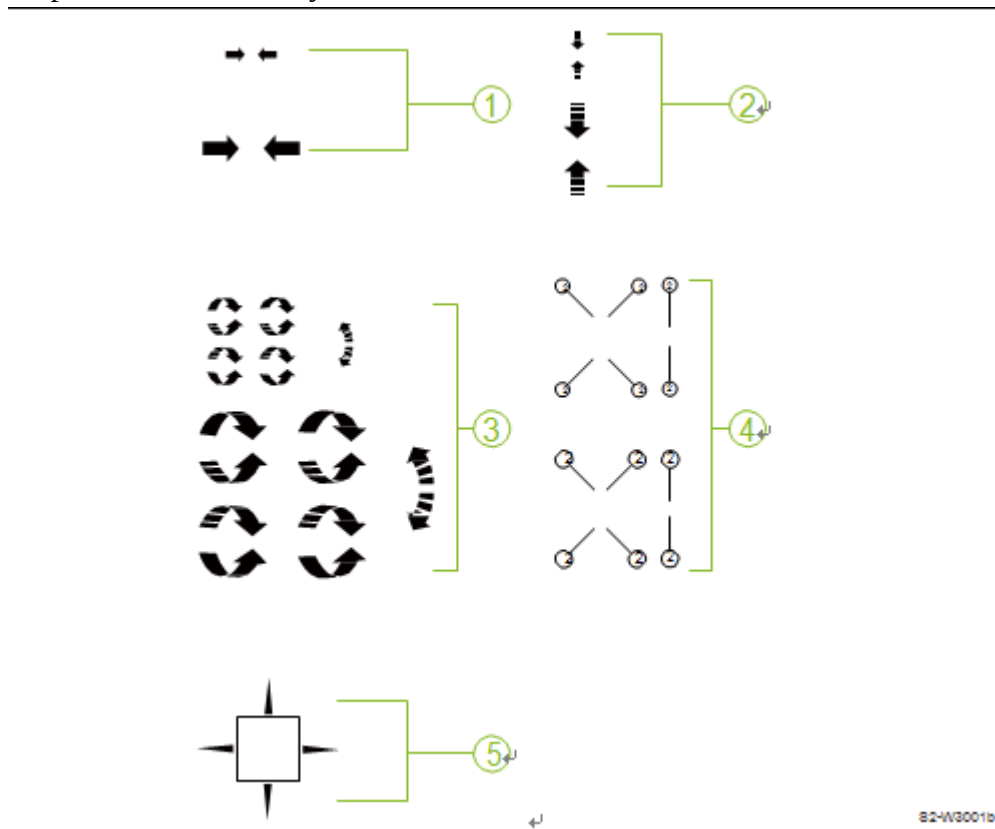
Tire and wheel inspection and transposition

Check the tires for abnormal wear or damage, if to make the tire wear evenly and extend tire life, the tire transposition is needed. If abnormal or premature wear, check the wheel alignment situation, and then

check the wheels for damage.

V. Maintenance Information System

(I) Description of arrow and symbol used in the manual



1. Indicator arrow
2. Move direction of the arrow
3. Turn direction of the arrow
4. Part number label
5. Part enlarged

VI Health and safety

(I) Description

Vehicle maintenance, repair and many related operations will affect personal safety or health problems, this section some of the risks associated with material and equipment operation listed, and also safety guidelines to avoid such hazards.

This section does not include all matters related to health and safety, so all operations and procedures to deal with the material should be implemented in the precondition of safety and health. Before using any product, product manual provided by the manufacturer or supplier shall be consulted.

(II) Acid and base

Such as corrosive sodium carbonate and sulfuric acid.

Use of batteries and other cleaning materials are irritating or aggressive to eyes, skin, nose and throat, which will also cause burns to human body and damage to ordinary protective clothing.

Avoid splashing in the eyes, skin and clothing as well as wear suitable protective clothing, gloves and goggles to avoid inhalation spray. Be sure to prepare nearby wash devices such as: eye wash bottle, lotus and soap for convenience and timely help when splash events occur. Eye danger signs

should be marked prominently.

(III) Brake fluid

There will be a slight irritation if splashed on the skin and eyes, try to avoid direct contact with the skin and eyes, because of its very low pressure, inhalation of brake fluid vapor at room temperature is not high risk.

(IV) Chemical materials

The using, storing and handling of chemical materials such as solvents, sealants, adhesives, coatings, resin foam, battery acid, engine coolant, brake fluid, fuel, lubricating oil and grease should be noted. They may be toxic, harmful, corrosive, irritant or highly flammable, and there odors and dust is a high risk.

The impact of long-term excessive exposure to chemical environment could be immediate or chronic, transitory or eternal, cumulative, surface, life-threatening, or may affect life expectancy.

Chemical materials - operation should be performed

- Carefully read and follow the warnings and cautions on raw container, and any accompanying leaflets, posters or other instructions for use, health and safety information table of the raw material, all of which can obtain from the manufacturer.
- If stained with chemicals, should be removed from the skin and clothing immediately, if immersed serious, clothing should be replaced immediately and thorough cleaned.
- Strictly compliance with work step instructions, and wear protective clothing to avoid direct contact with skin and eyes.
- When in the course of processing chemicals, wash first before break, eating, smoking, or using toilet facilities.
- Keep the work area clean, tidy and with non-chemical material spill.

Chemical materials - actions should be avoided

- Do not freely mix chemicals unless with the manufacturer's instructions; some chemicals can form other toxic or harmful ones, when mixing, it can release other toxic and harmful gases and may lead to other explosions and other accidents.
- Do not spray chemicals in a closed environment.
- Do not heat chemicals unless with the manufacturer's instructions; because some chemicals are highly flammable, and some may emit poisonous gases.
- Do not let chemicals container remain open, its emitted gases may accumulate to toxic, harmful or explosion degree. Some gas is heavier than air and may accumulate in a confined space.
- Do not put chemical materials into an unmarked container.
- Do not use chemical materials for hands and clothing cleaning. Chemicals, solvents and fuels in particular, will make the skin becomes dry, and may cause allergies leads to skin inflammation or through the skin directly absorbing toxic and hazardous substances to affect health.
- Do not store other chemical materials freely with an empty container unless the container has been cleaned with supervision
- Do not arbitrarily olfactory or smell chemicals. Exposed to high concentrations of gas shortly may still poison or get injured.

(V) Dust

Powder, dust and dirt may be irritating, noxious or poisonous, inhaling powdered chemical materials as well as due to dry friction operation raised dust should be avoided, if ventilation is poor, a respiratory mask protective gear should be wearied to prevent inhalation of dust.

Dust combustible material may cause a risk of explosion, explosion item and fire should be avoided.

(VI) Shock

Use of electrical equipment in compliance to description, or misuse of equipment in good condition, may cause electric shock. Be sure to regular maintenance and test the electrical equipment within the specified time. Faulty equipment shall be marked, it is best to move outside of the work area. Worn, kinks, cut, cracked or otherwise damages to wires, cables, plugs and sockets are prohibited and do not allow electrical equipment and wiring in contact with water. Ensure to protect electrical equipment with proper protection fuse. Do not misuse electrical equipment or use any equipment with hidden faults, if so its result may affect personal safety. Be sure moveable electrical equipment cables will not be nipped and damaged.

Implement basic first aid training must be carried on a dedicated appliance operator.

In the event of a shock:

- Before contact with the victim, first turn off the power
- If cannot turn off the power, then use a dry insulator material to remove the power off the victim.
- If received specialized first aid training, perform first aid immediately.
- Request medical assistance.

(VII) Exhaust

Exhaust gas contains toxic and hazardous chemicals, such as carbon oxides, nitrogen oxides, acetaldehyde, lead and aromatic hydrocarbon substances. Only in the case of appropriate exhaust ventilation equipment or common ventilation equipment with open space, engine can operate.

(VIII) Fibrous isolation

Fibers are used to isolate noise and sound. Its surface nature with sharp edges can cause skin irritation. During operation, the procedures should comply with instructions and wear gloves to avoid skin contact with excessive fiber.

(IX) Fire

Many materials related to vehicle maintenance are extremely flammable. After burning, some materials will produce toxic and harmful gases. In the storage and handling of flammable materials or solvents, do follow fire safety, especially near electrical equipment or ongoing welding operation areas. Before using electrical and welding equipment, first make sure there is no fire hazard. When using welding or heating equipment, prepare a proper fire extinguisher around the work area.

(X) Emergency

Not only to comply with the law, in the workplace it is best to have personnel who has received professional training in first aid. If spill to the eyes, rinse with water at least 10min. If the skin is contaminated, use soap and water to clean the contaminated area. If it is cold injury, it should be immersed in ice water or cold water.

Personnel who inhale toxic gases should be immediately transferred to fresh air if adverse phenomenon persists, should seek medical attention immediately or taken to hospital. If accidentally swallowed the liquid should inform physicians label information marked on the container. Unless there is instruction on the label, otherwise do not blindly lead to vomit.

(XI) Foam – Polyurethane

Foam is used for curing the seat cushion and decoration. Comply with manufacturer's instructions.

Component does not produce chemical yet may have irritant effects and may be harmful to the skin and eyes, when operate, wear gloves and goggles. Personnel, who has chronic respiratory diseases, asthma, bronchial problems, or suffering from a topic, should not handle or near the uncured materials, its spare parts, vapor or spray may cause direct irritation and allergic reactions and may be toxic and harmful. Do not breathe vapor or spray, these materials must be used in a well-ventilated, and respiratory protection situation. The mask cannot be removed immediately after spraying, wait until the vapor and spray dissipated completely.

Burn uncured foam components with the aged ones will produce toxic and harmful gases. During the foam operation, prohibit smoking, use of fire and electrical equipment unless vapor, spray has been completely cleared. All foam or special foam thermal cutting, should be operated in a well-ventilated environment.

(XII) Fuel

Minimize direct skin contact with fuel, if exposed, wash the exposed skin immediately with soap and clean water.

Gasoline Easily combustible material - comply with the smoking ban. If swallowed can cause mouth and throat irritation, stomach absorption can lead to general weakness and confusion, a small amount of gasoline will affect the lives of children, therefore, the effect to lungs is a very dangerous thing.

Gasoline can cause dry skin; prolonged or frequent exposure will cause skin allergies inflammation, if entering eyes will cause pain. Motor gasoline may contain large amounts of benzene, can cause poisoning after inhaling, so the concentration of gasoline vapors must be kept low. High concentrations of gasoline vapor may cause physical discomfort to eye, nose and throat irritation, nausea, headache, depression and drunken, and lead to rapid loss of consciousness.

When gasoline is processed, maintain good ventilation, when operating in confined spaces pay especial attention to avoid the risk of inhalation of gasoline vapors due to spills.

When clean and maintain store gasoline equipment, pay special attention. Gasoline cannot be used as a cleaning agent, do not use mouth to suck it.

(XIII) Gas cylinders

Gases like oxygen, acetylene, argon and propane, usually stores in the 13.8Mp (2001psi) pressure gas cylinder, be particularly careful in the process of dealing with these cylinders, avoid mechanical property damage to cylinder or valve. Gas filled in the cylinders should be given a clear and appropriate label.

Cylinders should be stored in a well-ventilated place, and avoid exposure to ice or sunlight environment. Fuel gases, such as acetylene and propane should not be stored together with the oxygen cylinders.

Pay special attention to prevent gas cylinders and pipeline leaks, and avoid sources of ignition. Only trained personnel can be conducted with a gas cylinder-related work.

(XIV) Common workshop tools and equipment

It is very important to always keep all of the tools and equipment in good working order and proper operation. Remember not to leave any tools or equipment used contrary to the purpose as its design features. Do not make equipment like cranes, jacks, axles and chassis brace or sling load in excess of its maximum load limit. Damage caused by overload may not necessarily immediately apparent, but may cause severe accident when use the next time. Do not use damaged or poor working conditions tools or equipment, especially some high-speed devices such as: wheel. Damaged wheel will be broken and crack without warning and cause serious injury.

When using the wheel, chisel or blasting equipment, wear appropriate eye protection equipment. When using the sandblasting equipment to handle asbestos-containing materials or using a spray device to do business, wear appropriate breathing mask. Ventilation equipment to control the dust, spray and dust content in the environment is needed.

(XV) Lubricant and Grease

Avoid prolonged repeated contact with mineral oil, all lubricants and grease, all of which are irritated to the eyes and skin.

Health Protection Security Code

- Avoid long and repeated contact with engine oil, in particular with the used ones.
- Wear protective clothing, including impervious gloves.
- Do not put engine oil stained cloth into pocket.
- Avoid engine oil to contaminate clothing, especially underwear.
- Do not dress in clothing and shoes contaminated by engine oil. Overalls must be cleaned regularly and kept clean.
- Open wounds should be able to receive timely emergency treatment.
- At work, apply cream to the skin to avoid direct skin contact with engine oil.
- Use soap and water to clean, remove all of the engine oil. Apply protective agent containing lanolin will help replace the natural oils removed on the skin.
- If the skin lesions occur, seek medical attention and medical treatment immediately.

Remove the residual grease before working on the assembly if possible.

- If there may be direct contact with eyes, wear goggles, like chemical goggles or face shield; what's more, eye wash equipment should be equipped.

Environmental precautions

Used waste engine oil and oil filter should be recycled through an authorized or licensed waste disposal business, or waste engine oil recyclers. If in doubt, contact the local authorities of workplace-related departments to deal.

Discard the used engine oil directly into the ground, sewer or drainage, or pour into water pipe is illegal.

(XVI) Noise

During certain operations, high-decibel noise will be produced which may cause hearing damage. In this case, wear proper hearing protection devices.

VII Fastener specifications

(I) Fastener specifications

JAC engineering standards have been adopted part of ISO defined standard metric fasteners size, which aimed at reducing the number of fastener size, while maintaining optimal quality of each screw thread size. (II) Main fastener tightening torque table

No	Item	Torque (N m)	Remark
1	clutch pedal fixing bolt	20~28	
2	clutch pedal fixing nut	20~28	

3	pipe mounting bracket	20~28	
4	exhaust bolts	8~12	
5	shaft self-locking nuts	240~260	
6	lower arm ball joint connection nut and knuckle	100~120	
7	damper assembly connected to knuckle nut	100~120	
8	speed sensors	10~15	
9	front horizon bar mounting bracket and the sub-frame mounting bolts	60~72	
10	front shock absorber and body mounting nuts	60~72	
11	front shock absorber self-locking nut	50~70	
12	bolt connected with front shock absorber and knuckle	100~120	
13	lower arm ball pin and knuckle connecting bolt	60~72	
14	lower arm pin and lower arm connecting nut	60~70	
15	lower arm front liner and sub frame connecting bolts	130~150	
16	lower arm rear liner and sub frame connecting bolts	130~150	
17	engine rear suspension and front sub frame connecting bolts	130~150	
18	front sub frame front fixing nut	110~130	
19	front sub frame rear fixing nut	60~72	
20	drive shaft and front hub assembly self-locking nut	240~260	
21	rear shock absorber and body mounting bolts	30~45	
22	Rear shock absorber and rear torsion beam connecting bolts	60~72	
23	Bolt connect to torsion beam and rear hub	60~72	
24	rear twist beam and body mounting bolts	130~150	
25	wheel nut	90~110	
26	steering tie rod nut	45~55	
27	spare tire fixing stud	25~35	
28	front brake caliper and knuckle connecting bolt	75~85	
29	brake and rear hub connecting bolt	65~75	
30	rear twist beam rear brake caliper bolts	65~85	
31	brake caliper positioning pins	35~45	
32	brake disc and hub fixing screw	10~15	

33	front and rear brake caliper bleed screw	7~13	
34	brake pedal bracket bolt	20~25	
35	brake pedal fixing nut	20~25	
36	brake hose and brake caliper bolts	25~30	
37	brake hardware fittings	16~18	
38	parking brake control lever fixing bolt	20~25	

39	fixing screw 39 parking brake switch	6~8	
40	parking brake drawing mounting bracket nuts and bolts	7~11	
41	speed sensor fixing bolt	8~10	
42	brake hardware fittings nut	16~18	
43	ABS controller and body assembly bolts	20~25	
44	steering wheel retaining nut	42~52	
45	steering column mounting nuts	20~25	
46	steering column mounting bolts	20~30	
47	controller mounting bracket bolts	8~10	
48	steering column assembly and steering shaft assembly connecting	30~35	
49	Steering shaft assembly and mechanical steering bolts	30~35	
50	mechanical main steering gear mounting bolts	95~105	
51	mechanical auxiliary steering gear mounting bolts	95~105	
52	front tie rod bundle adjustment nut	45~55	
53	Steering outer ball head slotted nut	40~50	

VIII Noise, vibration and abnormal sound

(I) Diagnostic information and procedures

Wind noise / air sound

△ **WARNING** Refers to "Warnings and Precautions" in the "warning about the assistant driver."

△ **Note** when the technician is repairing the fault location, the vehicle should drive by assistant, otherwise, may cause injury.

In order to accurately confirm the location of wind noise, test drive should be in the car. In general, the presence of wind noise has major leaks and minor leaks, if not repair all leaks in the repair process, it can only reduce wind noise but not completely eliminate wind noise. Test drive service personnel should take the following tools to help diagnose the specific location of wind noise:

- Stethoscope
- Masking tape
- Caulking article
- Marker
- Screwdriver road test in accordance with the following procedures:
 - Select a line, which has straight direction of east, south, west, north four different streets.
 - Select fewer or smaller traffic noise streets to avoid affection.
 - In the speed that the customer thinks is most obvious noise or emit noise to test, exceeding legal limits of speed is strictly prohibited.

The following wind noise is the external wind noise:

- After lowering the window glass of the vehicle while driving, wind noise can be heard immediately.
- When post tape on various decorative seal and gap, wind noise immediately disappear.

The internal wind noise is caused by air escape from the car, repairing should take the following methods:

- When determining the leak position, put tape on the door pillar relief valve to form the pressure and

enhance wind noise.

- Use a stethoscope to confirm leak location.
- Use masking tape to temporary repair leak site.
- Continue road test to confirm whether totally eliminated wind noise or there is other leak site.
- Make sure that all the leak test found by road test, return to the repair shop, repair permanently with a professional sound positioning methods and sealing materials.

Vibration

Most high-speed vibrations are caused by the dynamic balance of the wheel lost, if there are vibrations after the dynamic equilibrium, refers to the following reasons:

- tire round failure
- rim round loss
- Tire has hardness deviation

Measure free run out of tire and wheel, if cannot detect all causes of vibration, the above-mentioned three reasons called load run out, replace the original tire and wheel assembly with known good tire and wheel assembly to repair the fault vehicle.

Vibration occurs in speed lower than 64km / h usually caused by beating. Vibration occurs in speed higher than 64km / h usually caused by beating and imbalance.

Correct uneven tire

There are two ways to correct tires balanced but still have vibration. One method is to use automatic machine, mount the tire to the machine and rub a small amount of rubber from the tire tread around the high point on both sides. This method to correct the tire is usually permanent. If comply with specifications when operate, will not have a significant impact on the appearance and tread life of the tire. Use with edge-type tire repair tools for correction is not recommended, since this would shorten the life of the tire, and cannot solve the problem fundamentally.

Another method is to disassemble the tire, turn the rim upside down by 180 ° which only used when vibration of the tire and wheel assembly is confirmation of the diagnosis because this method may cause a good wheel assembly has vibration intact.

Abnormal sound

If at high engine speeds the car creaks, check whether the underbody heats shield.

- Lift the vehicle and perform a visual inspection
- Bent the insulation panels slightly to make a gap with the bottom of the body.

Vehicle front end squeak when the weather is cold

Check front balancing pole isolation pouches

- Road test the vehicle when it's cold and passing from the road potholes to reach the maximum stroke of the front suspension.
- Removing the tape from the isolated pouches on the front balancing pole, and reinstall the isolation pouches on tape.

Vehicle issued abnormal sound when bumping

Check the baggage compartment if the spare tire is properly fixed

- Open the luggage compartment; check the spare tire and vehicle tools.
- Reseat spare tire and vehicle tools.
- Road test the vehicle to inspect wither abnormal noise is eliminated.

Rear part of the vehicle issued glass percussion sound when bumping.

Check whether the rear door latch improperly adjusted

- Road test vehicle to check the situation.
- Loosen the lock nut and adjust the latch.

Door creak

Check whether the door interior panel harness connector creak.

- Tap the interior panels and carefully observe whether heard creaking
- Remove the door interior panels and wrap wiring harness connector with foam pad according to actual situation of the vehicle

Door squeak when using

Check whether the door hinge lack of lubrication.

- Operating the door back and forth and listen carefully to see whether the door squeaks.
- Use loose rust door hinge and apply grease lubrication.

Squeak when shifting manual gearbox (cold and appear at the cold state)

Check the manual shift manual gearbox assembly under the dashboard fender starter jacket

- Switch gear shift lever in the room and see if there is squeak.
- Remove the floor console and replace the jacket under the shift lever or coat it with talcum.

(II) Maintenance guide

Wind noise / air sound external

Wind noise Wind noise leak repair methods are very close to water leakage. The actual repair procedure depends on the type of repair seal.

Vibration

Wheels and tires under balancing

Use an electric balancing machine to dynamically balance car wheel. Balancing machines are easy to use both for static equilibrium and dynamic equilibrium. Different from the car balancing machines the under car balancing machine cannot correct the imbalance of the brake disc.

However, the accuracy of the under balancing overcome this drawback, fix the wheel to the balancing machine, make a cone through the center hole of the back, without passing through the wheel nut holes.

Wheels and tires car balancing

Car balancing can correct the brake disc vibration caused by imbalance.

△ Warning Control the lower supporting arm in the normal horizontal position to avoid drive axle damage. When the wheels sink reaches full stroke, do not operate the vehicle in gear.

- During the car balancing operation, removing the balancing pad installed during the dynamic balancing is prohibited.
- If doing balancing there is the need to increase the weights over 25g, divide the balancing pad into two blocks, and mount to the inner and outer rim.
- Using the engine to turn the driven wheel and wheel assembly.

Wheel and tire position fitting

Wheels and tires are fitted at the factory, and match thicker parts of the tire radial direction (also referred to as the high point) to the minimum radius of the wheel (also called low point). When the tire just finished, tire initial high point marked with a red paint mark or outer wall is attached to label. Wheel low position is the valve core. Before removing the tire from the wheel, mark first in the tire valve core, to ensure that it can be installed into its original position.

Abnormal sound

Abnormal sound maintenance

Abnormal noise mainly comes from the vehicle relative motion which should not exist between the parts. Repair abnormal sound in three ways:

- Secure fastening parts, to make sure there is no relative movement of the vehicle in the process of moving.
- Separate components, so that they are not in contact at work.
- Isolate parts, so that there is no abnormal noise components generated when moving. Uniform low friction surface can be used to eliminate viscosity between the sliding parts

IX. Vehicle identification

(I) Vehicle identification number

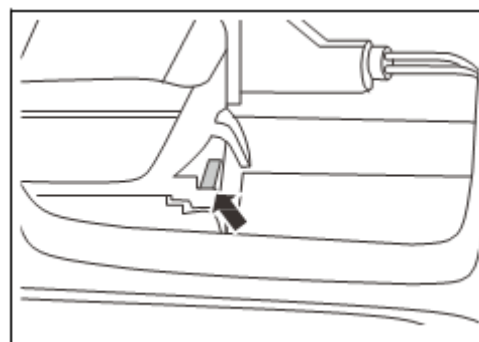
1. Vehicle identification number

1) The vehicle identification number (VIN) plate is a statutory marker.

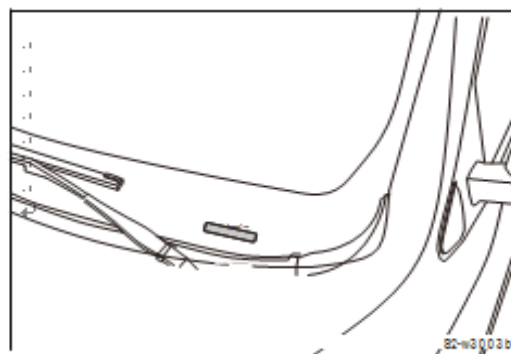
2. Vehicle identification number (VIN) print position

Vehicle identification number (VIN) plate has two printing positions

1). One position of the vehicle identification number (VIN) is engraved on the front seat and right side of front crossbar. Adjust the passenger seat to the back end; open the carpet under the seat cover to see printed VIN code



2). The other location is in upper left corner of the instrument panel which can be seen through the front window outside the vehicle

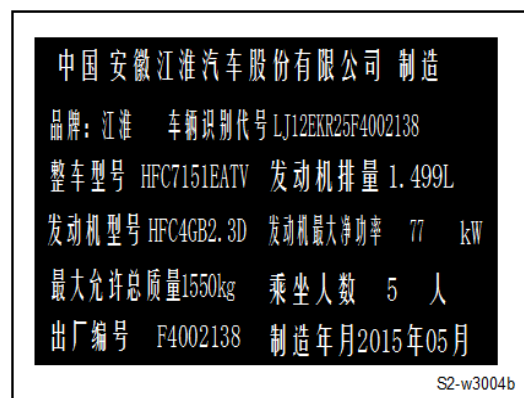


(II) Signs

1. Plate.

1). Plate is located in the front passenger side of the lower portion of the outer B-pillar.

2) Plate - vehicle compliance certification.



2. Tire information plate

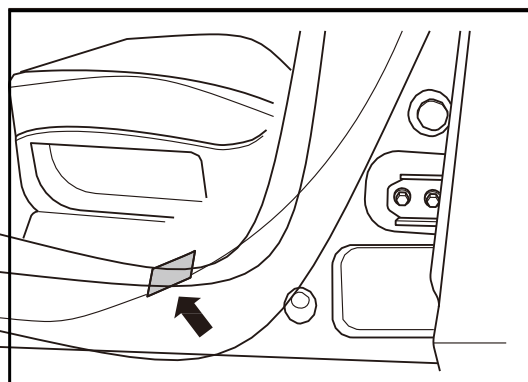
1) There is some basic information about the tire on the tire information signs.

轮胎规格 TIRE SIZE	轮胎充气压力 kPa TIRE INFLATION PRESSURE kPa	
	前轮 FRONT	后轮 REAR
205/55R16 94V	220	220

S2-w3005b

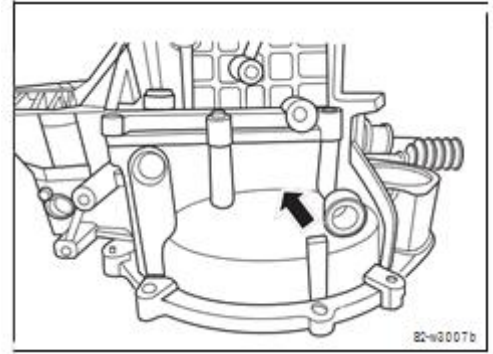
3. Tire pressure label

1). Tire pressure label affixed to the driver's door side of the vehicle, the label display the cold tire inflation pressure and specifications. The recommended cold tire inflation pressure on the label indicated is the minimum pressure required to support maximum vehicle load.



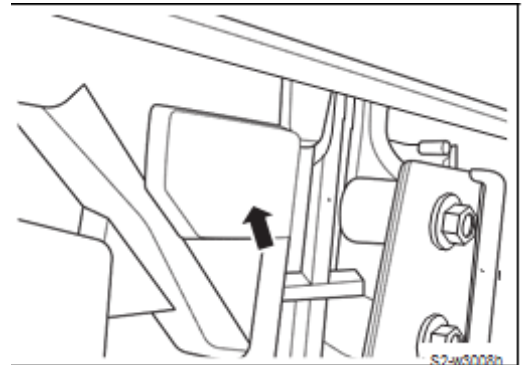
(III) Transmission identification number

1. Engraving position of the identification number.



(IV) Engine identification number

1. Engraving position of the identification number.
 - 1). Engraving position of the engine identification number



Clutch

I. Overview

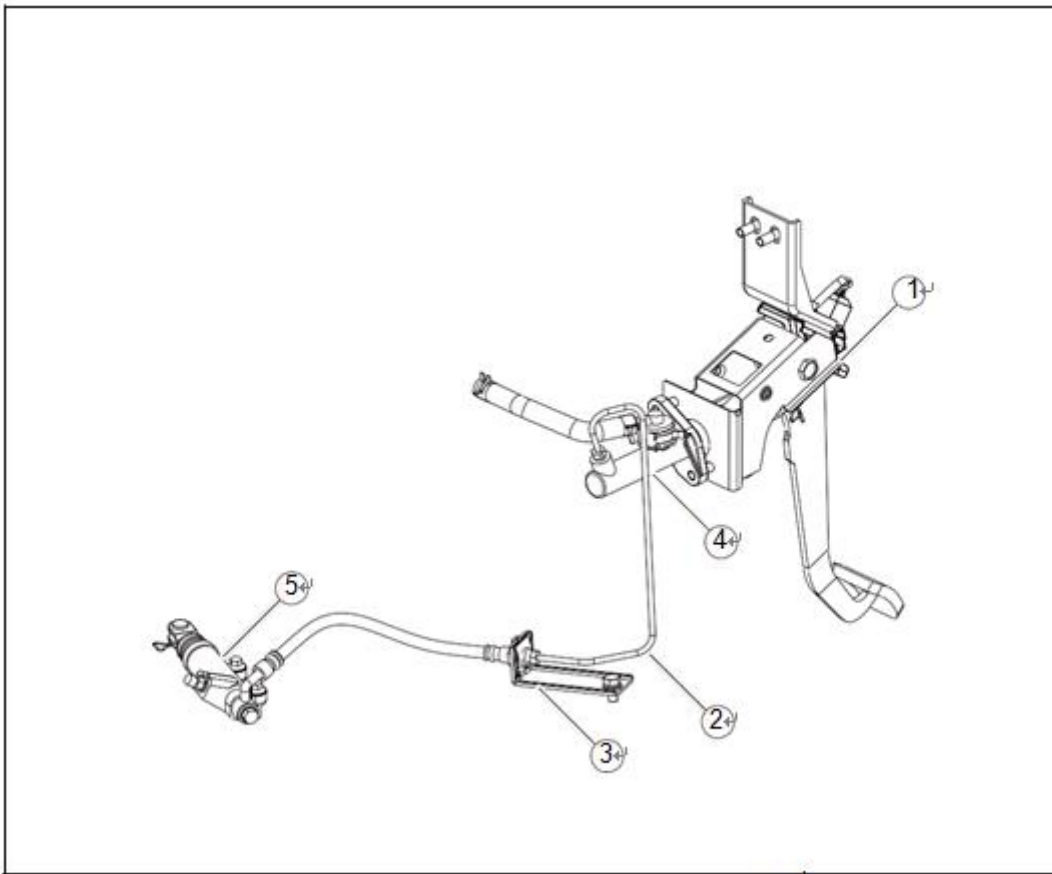
(I) Structure Summary

Architectural Overview

Clutch assembly is located between the engine and gearbox, the clutch pressure plate is fixed to the rear plane of the flywheel by a bolt assembly. Clutch disc and gearbox are connected by a spline input shaft which can slide axially, and transmit torque to the surrounding. During driving, according to the depressing or releasing the clutch pedal to temporary separate and gradually engage the engine and gearbox to cut off or pass the input power from the engine to the transmission.

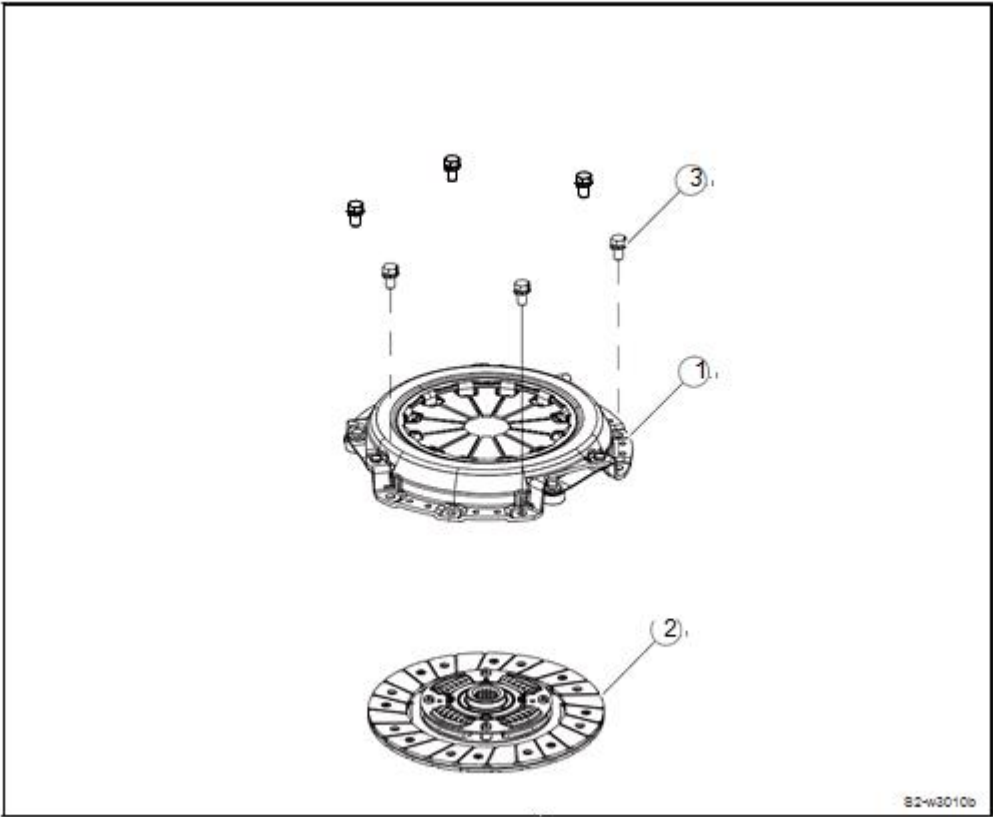
Clutch system includes the following components:

- Active parts: clutch pressure plate assembly clutch pressure plate assembly is bolted to the flywheel.
- Follower: Clutch disc Clutch disc and gearbox are connected by a spline input shaft. Active parts and the follower are kept in contact by spring pressure. This pressure is exerted by a diaphragm spring pressure inside plate assembly.
- Operating parts: clutch control system includes a clutch pedal, master cylinder, tubing, cylinder, separation fork and bearing, when depress the clutch pedal, through hydraulic pressure, master cylinder pushes cylinder, separation fork, through bearing pushes diaphragm spring separation claw, release the pressure plate, to disengage the clutch

Clutch control system

1. Clutch pedal assembly
2. Clutch hard pipe assembly -I
3. Clutch bracket -I
4. Clutch master cylinder and the inlet pipe assembly
5. Clutch cylinder assembly

Structure chart of clutch pressure plate and driven disc



- 1. Clutch cover and pressure plate assembly
- 2. Clutch driven disc
- 3. Hexagon head bolt and spring washer assemblies

(II) Maintenance parameters

Maintenance parameters

No	Item	Parameters
1	clutch pedal free travel	6~20mm

grease

No	Item	Grease model
1	cylinder	Kunlun II low temperature grease

(III) Torque parameters

No	Item	Torque (N m)	Remark
1	clutch pedal fixing bolt	20~28	
2	clutch pedal fixing nut	20~28	
3	oil pipe mounting bracket	8~12	
4	exhaust bolt	20~28	
5	clutch pressure plate mounting bolts	20~28	

(IV) Maintenance precaution

Precautions

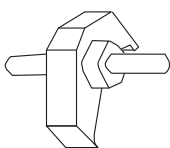
- The recommended clutch hydraulic oil is brake fluid "DOT 4".
- Do not reuse drained clutch hydraulic oil.
- Be careful not to spill clutch hydraulic oil on the body paint.
- Do not use gasoline or kerosene and other mineral oils; otherwise it will corrode the rubber parts of the hydraulic system.
- Do not disassemble master cylinder and hydraulic release bearing.

△ **WARNING** Use vacuum cleaner to clean clutch plate, but not with compressed air.

Inspection Points

△ **CAUTION** Do not use a vacuum pump or any other type of evacuation power plant to operate the system. Check the fluid level of the clutch hydraulic oil; make sure that the level is normal. Do not let the clutch hydraulic oil fall on the body paint or other components. If the clutch hydraulic oil spilled on the body paint or other parts, immediately wipe clean with a dry cloth.

(V) Special tools

No	Tool	Tool Dimensions	Description
1	Flywheel stopper		Fixed flywheel

II. Fault diagnosis

(I) Common fault diagnosis

Clutch assembly and clutch control system performance diagnosis should be performed by an experienced driver or a skilled vehicle maintenance technician.

The following (failure) diagnosis involves common problems and possible causes. After appropriate diagnosis, make adjustments according to the respective solutions in service manual diagnostic table and corresponding to the appropriate section in each of the specific program, replace the parts as required.

During vehicle maintenance, clutch pressure plate and clutch disc cannot be repaired, if any one of them is broken, replace the entire assembly.

If the clutch driven plate rivets polished or clutch disc polluted by oil or grease dirt, then it cannot be used. If you need to replace a part, use well qualified new parts to replace it. The table below will help diagnose the causes under the following conditions leads to emergence of a clutch system: not separation, separation incomplete; the engagement incomplete, slip, noise and jitter

The number in the diagnosis table does not mean order of examination, there is no precedence relations among the various possible causes.

(II) Diagnosis table

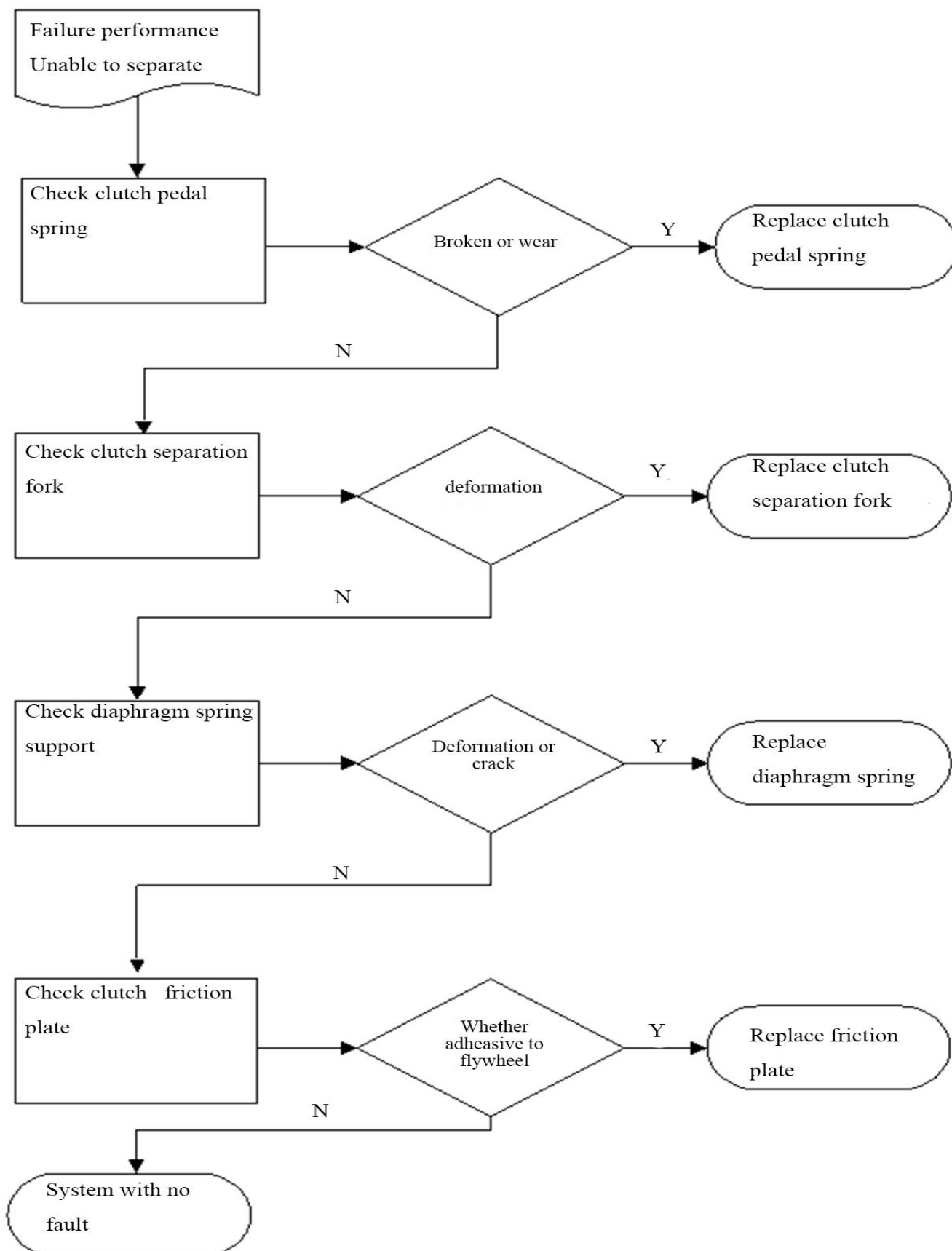
No	Failure performance	Failure cause analysis	Solution	Remark
		clutch lever deformation	replace the deformation part	Refers to

1	Unable to separate	diaphragm spring deformation	replace the deformation part	clutch unable to separate flowchart
		diaphragm spring support ring	replace the broken part	
		clutch pedal spring break and fatigue	replace the worn and broken part	
		clutch driven disc and flywheel or clutch pressure plate or bonding	adjusting clutch system	
2	Unable to incomplete separate	clutch driven disc deformation when it turns it will swing	replace deformation, wear, cracks and exceeding standard size parts	Refers to the unable to incomplete separate flowchart
		clutch driven disc broken	Replace clutch driven disc	
		clutch driven disc input does not match with the gearbox shaft input, or the input surface is worn	spline clutch disc not work well with the gearbox input shaft spline, to replace the clutch disc, if any necessary, replace the gearbox input shaft	
		clutch partly adhesive flywheel or clutch pressure plate or bite	replace the non-qualified parts	
		flywheel / clutch pressure plate / clutch disc exceeds standard size	replace the non-qualified parts	
3	Unable to incomplete connect	clutch pedal and the clutch control system drawing mechanical failure or improper adjustment	adjust clutch system, remove unnecessary gap, eliminate mechanical failure and reinstall improper assembly parts	Refers to the unable to incomplete connect flowchart
		clutch driven disc stained by oil or	Clean up the oil or grease dirt	
		clutch driven disc broken	replace the deformation worn and	
		no clutch pedal free travel	properly adjust clutch pedal free	
		diaphragm spring / clutch pressure plate / clutch lever/ Clutch disc splines deformed or damaged	replace clutch disc or clutch assembly problem	
		Clutch pedal and the clutch control system drawing mechanical failure or improper adjustment	adjust clutch system, remove unnecessary gap, eliminate mechanical failure and reinstall improper assembly parts	Refers to
		clutch plate wear	replace driven disc	

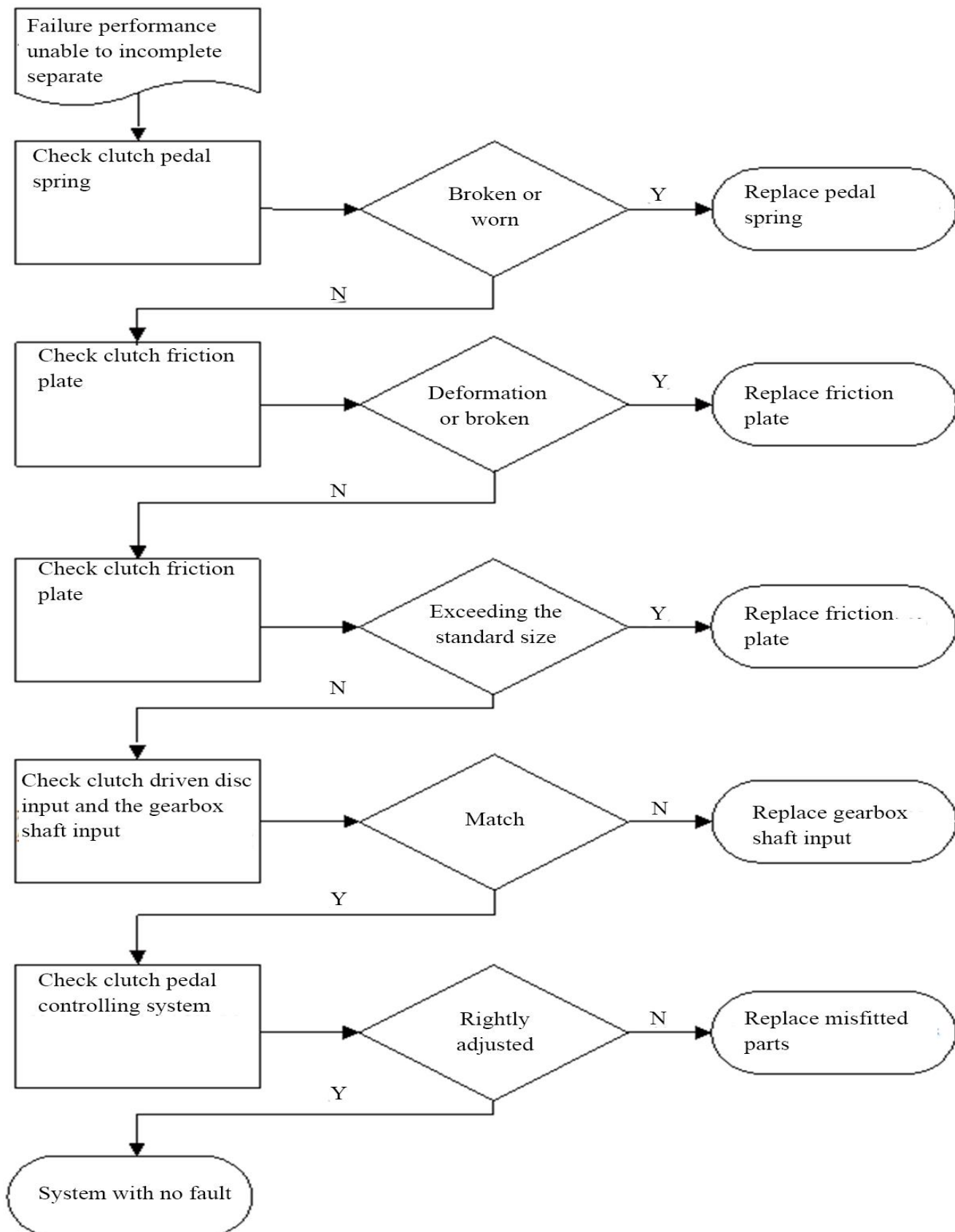
4	Slipping	Clutch contaminated by oil or grease	clean the grease or replace driven disc	clutch slippage flowchart
		Clutch engagement is not complete	The same with "incomplete separation" and "engaging incomplete" solutions	
		Flywheel / clutch pressure plate / clutch plate thickness exceeds a predetermined size	Replace non-qualified parts	
		improper driving leads to clutch housing over heating	Turn off the engine, cool the temperature in the clutch(if overheated) and operate further diagnosis	
		Improper installation	reinstall	

5	noise	Improper clutch driven disc	Install requested clutch driven disc	Refers to clutch noise flowchart
		Improper balancing	If any part has improper balancing, replace the whole clutch	
		Clutch thrust bearing failure	adjusting clutch brush and reinstall improper assembly of parts	
		Clutch disc torsion damping spring damaged	replace deformation, wear and tear parts	
6	Jitter	Clutch damper spring does not meet the specifications	Replace the driven disc	
		Clutch driven disc does not meet specifications	Replace the driven disc	
		Clutch pollution by oil or grease	Replace the driven disc	

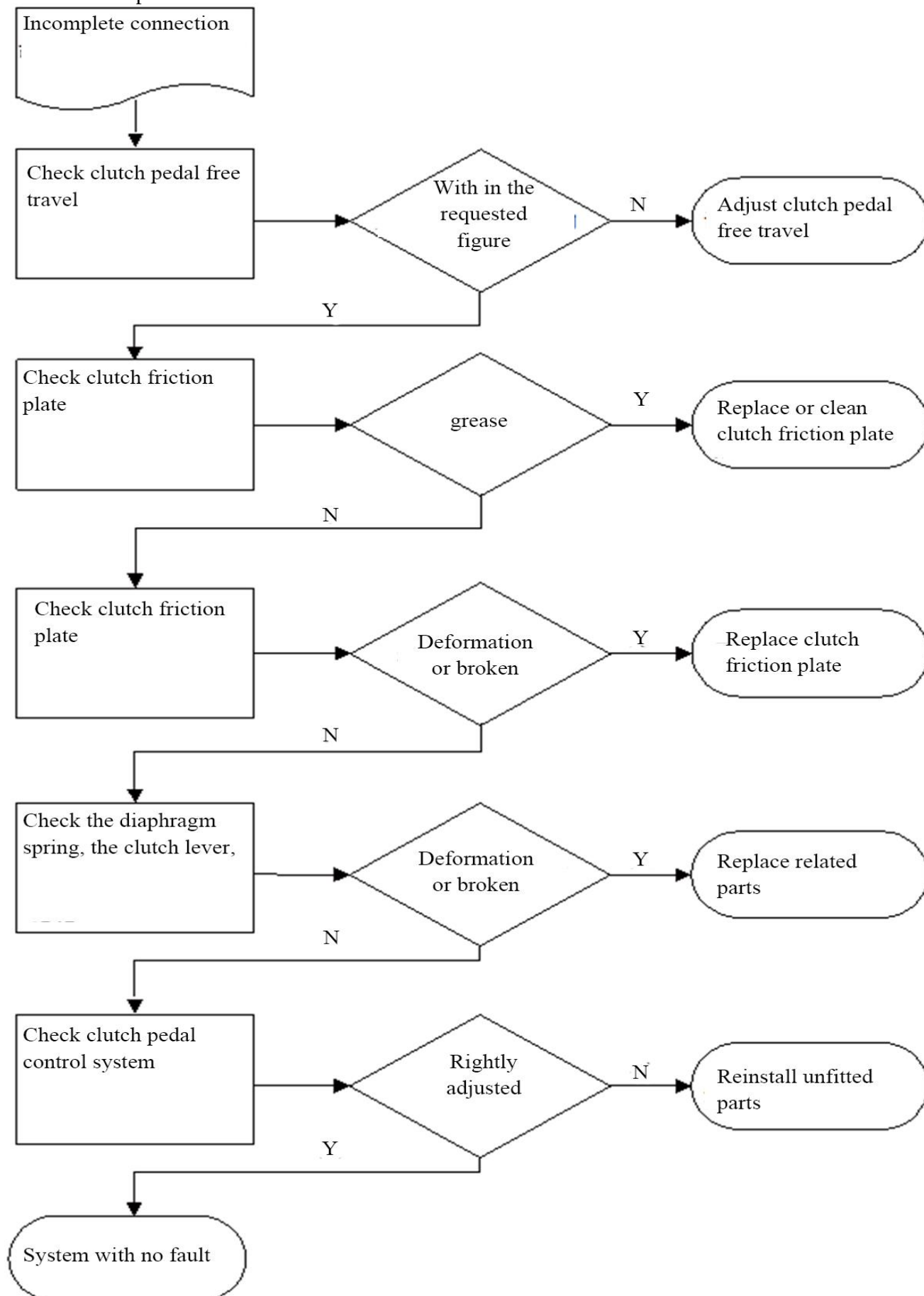
(III) Fault diagnosis flowchart
Clutch unable to separate flowchart



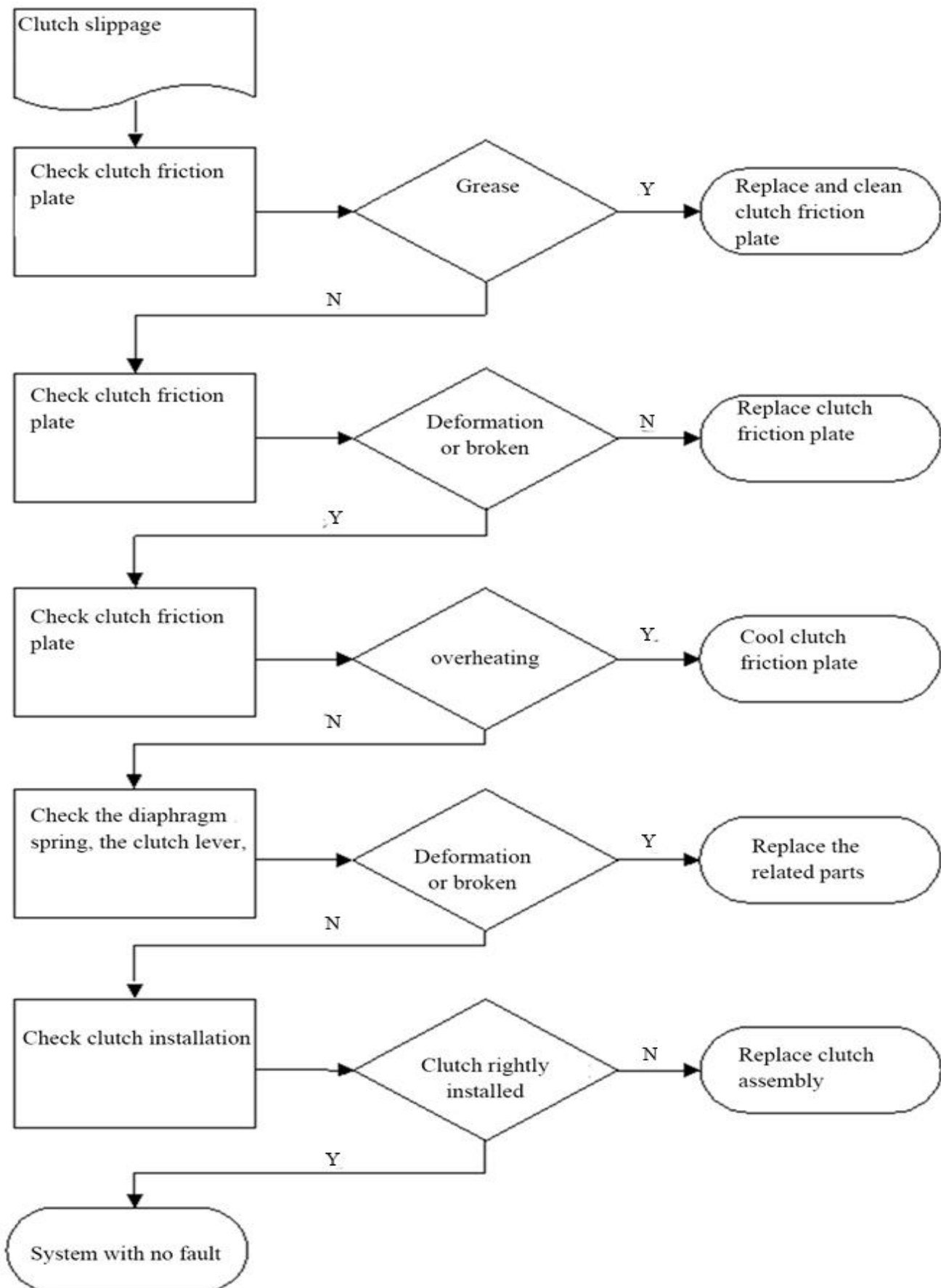
Unable to incomplete separate flowchart



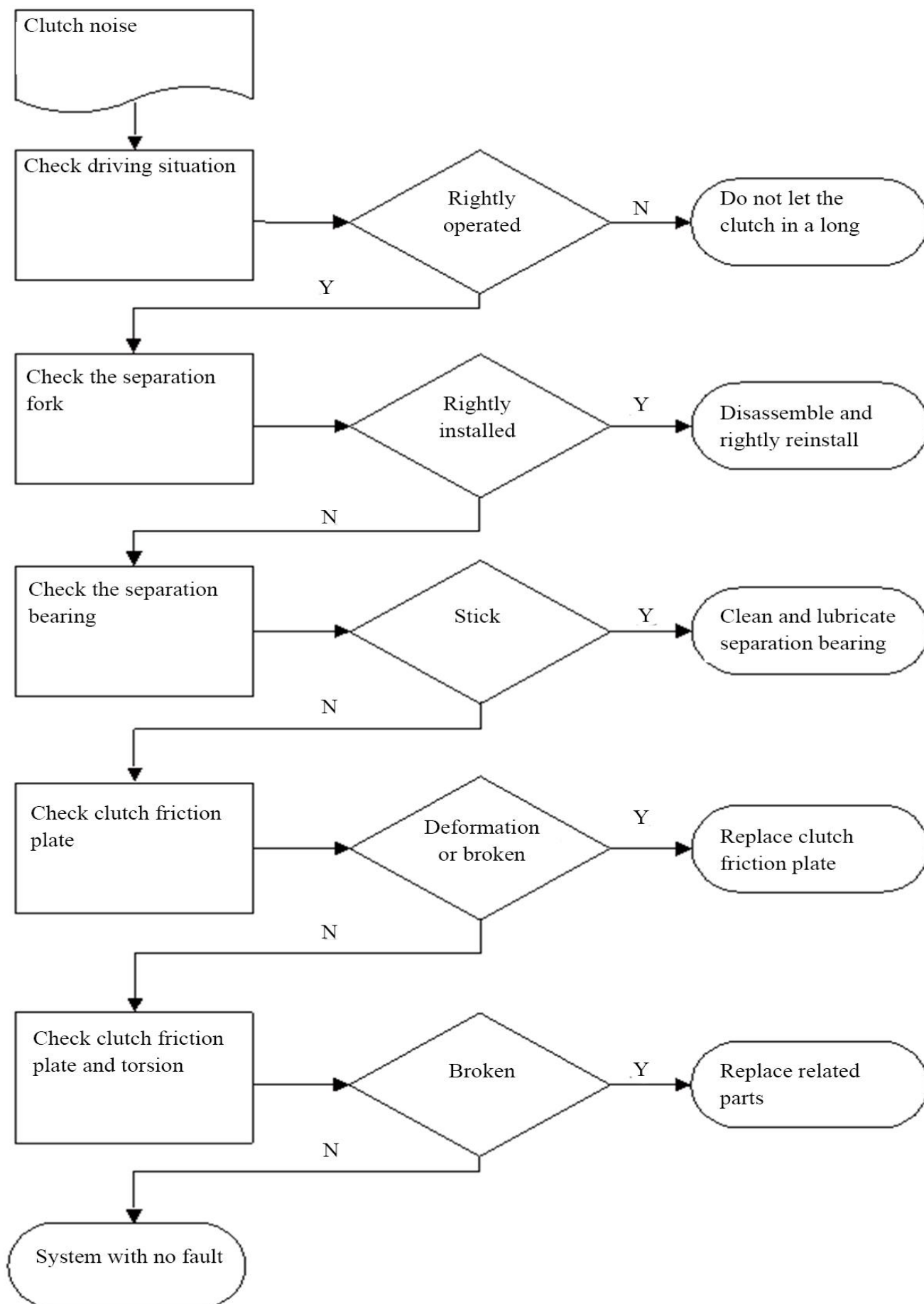
Unable to complete connect flow chart



Clutch slippage flowchart



Clutch noise flowchart

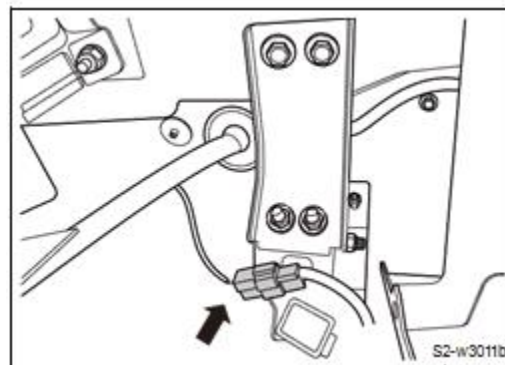


III Clutch pedal

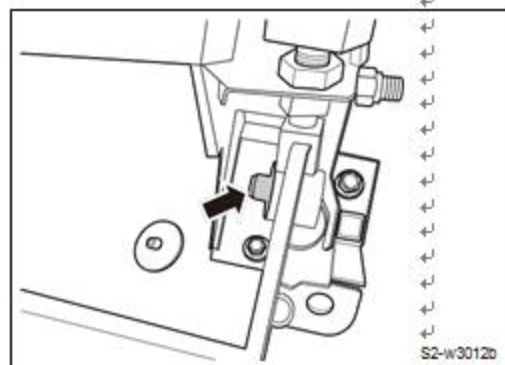
(I) Remove

1. Open the engine hatch,
2. Disconnect the negative battery cable,
3. Drain the clutch hydraulic oil refers to clutch hydraulic oil,
4. Remove the lower driver's side fender body refers to the lower driver's side fender body
5. Remove the driver's airbag assembly refers to driver's airbag assembly
6. Remove the steering assembly refers to steering assembly See
7. Remove the steering column on the shell package; under the steering column cladding refers to the steering column cladding
8. Remove the clock spring refers to clock spring
9. Remove the combination switch refers to combination Switch
10. Removing burglar alarm induction coil refers to induction coil
11. Remove ignition lock assembly refers to the ignition lock assembly
12. Remove the steering column assembly refers to the steering column assembly
13. Removing the clutch pedal

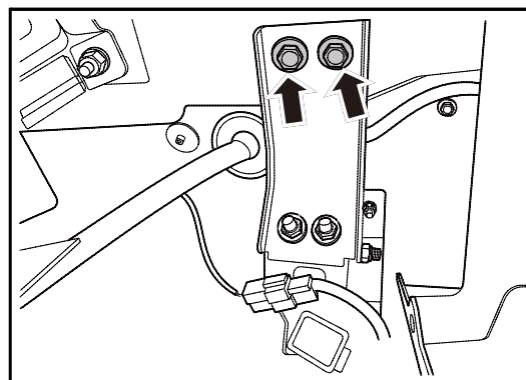
- 1). Disconnect clutch wire harness connector.



- 2). Remove the clamp connected clutch pedal and the clutch master cylinder, disassembly latch, disengage the connection of clutch pedal and clutch master cylinder.



- 3). Remove the two bolts connecting upper part of clutch pedal and body.



- 4). Remove the two fixing nuts connecting clutch pedal and the lower part of the body.
- 5). Remove the clutch pedal.

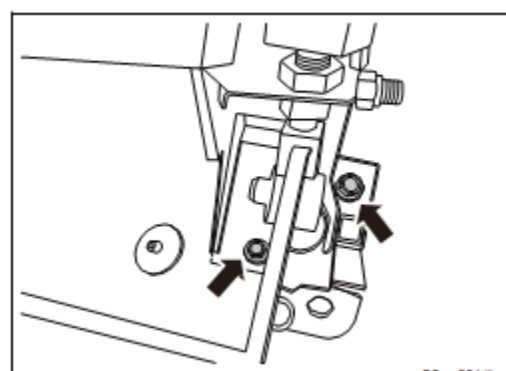
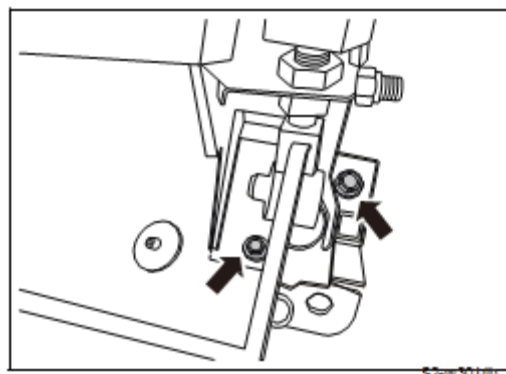
(II) Check

1. Check the clutch pedal after demolition
 - 1) Check if the clutch pedal is distorted, damaged, cracked or appears weld.
 - 2). If occurs, please replace the clutch pedal assembly

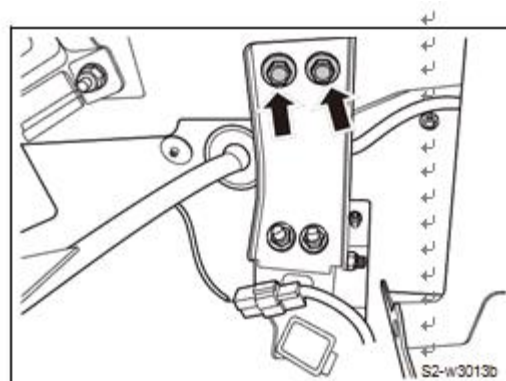
(III) Installation

1. Install the clutch pedal
 - 1). Place the clutch pedal to the mounting position.
 - 2). Install two nuts connecting he clutch pedal and the lower part of the body.

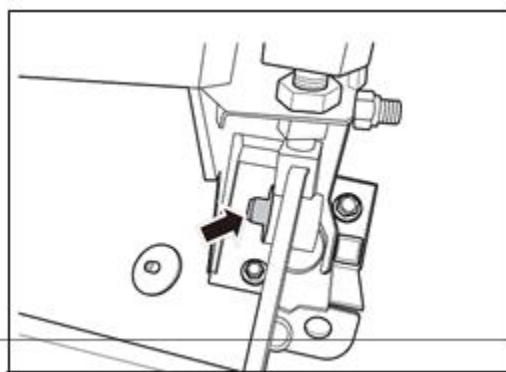
Tightening torque 20~28N·m



- 3). Install two bolts connecting the clutch pedal and the upper portion of the body. Tightening torque 20 ~ 28N • m

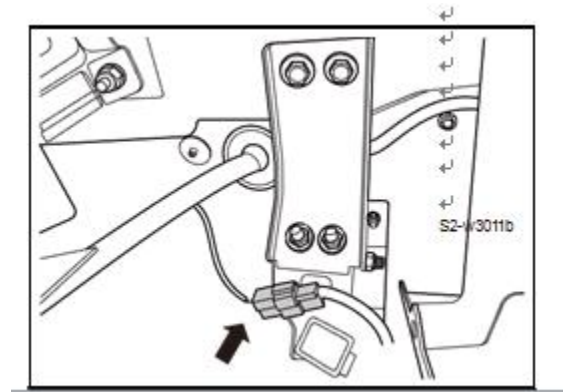


- 4). Install lock pin, install the clamp connecting clutch pedal and the clutch master cylinder.
- △ Note Before installation, coat low grease Kunlun II to the outer surface of the front pin.



5) Connect clutch harness connector.

2. Adjust the clutch pedal free travel
3. Install the steering column assembly
4. Install the ignition lock assembly
5. Install anti-theft induction coil
6. Install the combination switch
7. Install the clock spring
8. Install the lower steering column cladding, under the steering column cladding
9. Install the steering wheel assembly
10. Install the driver's airbag assembly
11. Install the lower driver side fender body
12. Fill the clutch hydraulic oil
13. Connect the negative battery cable
14. Close the engine hatch



IV. Clutch pedal stroke

1. Measure clutch pedal free travel
 - 1). gently press the clutch pedal by hand to determine when the pedal drop resistance, measure clutch pedal free travel by scale.

Free travel: 6 ~ 20mm

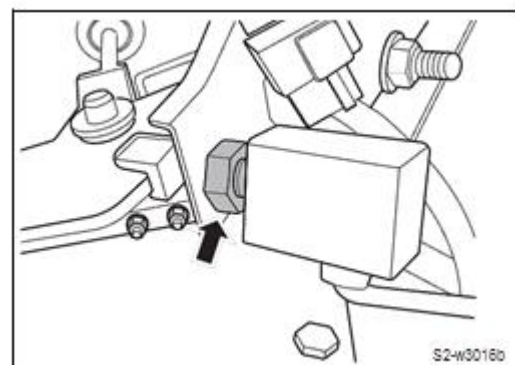
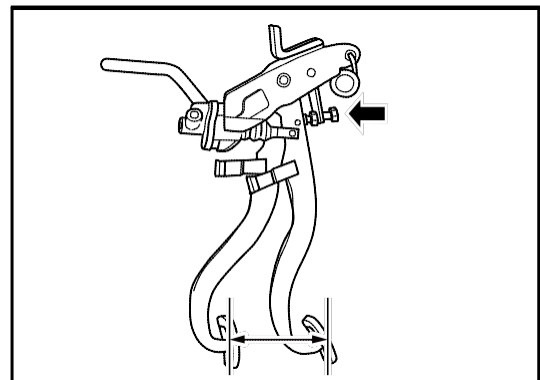
△ Attention if the clutch pedal free travel is not in specified region, then it must be the clutch hydraulic circuit with air or clutch master cylinder is faulty. Exhaust the systems, check the master cylinder or dismantle the clutch.

2. Adjust the clutch pedal travel

1) Loosen the lock nut and turn the bolt, adjust the clutch pedal travel. After adjusting, tighten the lock nut.

Tightening torque 20 ~ 28N • m

△ Attention when adjust the height of the clutch pedal, do not push the lever to the clutch master cylinder.



V. Clutch hydraulic oil

1. Drain the clutch hydraulic oil
 - 1) Open the brake fluid filler cap.
 - 2) Place drip pan.
 - 3). Empty brake fluid
 - 4) Install the brake fluid filler cap.

△ Note cover the painted surface with a rag or cloth to prevent adhesive of brake fluid.

2. Fill clutch hydraulic oil

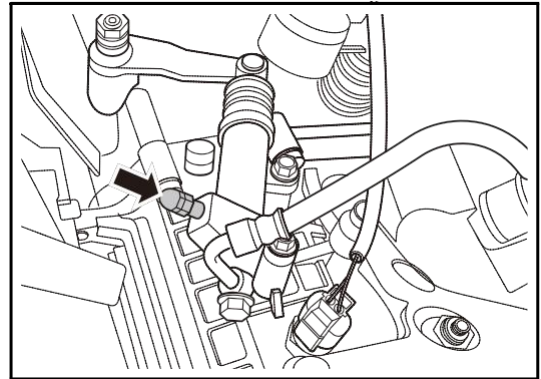
- 1). Depress the brake pedal several times until the complete elimination of the vacuum booster pressure.
- 2) Open the brake fluid filler cap.
- 3) Fill brake fluid.

△ NOTE Open the front tank cover, clean, only allowed to store brake fluid in a sealed container.

3. Clutch system exhaust

△ Note after installing the clutch line, clutch master cylinders, clutch assembly and clutch cylinder, if found pedal weak, exhaust the system

- 1) Loosen the clutch working cylinder exhaust bolts.



- 2) Slowly depress the clutch pedal until the air is completely discharged.

- 3).) fully depress the pedal and hold, tighten the exhaust bolts.

- 4) Supply clutch hydraulic system with hydraulic oil.

△ Note always keep the liquid level in the tank between MIN and MAX

- 5) Repeat steps 1-4 until clutch hydraulic oil discharged from the system is clean and with no air bubbles.

4. Check whether the clutch is working properly

- 1) Start the engine; depress the clutch pedal, carefully hang in reverse gear after 2s. If there is big noise during gear selection, fully depress the clutch pedal five times to exhaust the system.

- 2) After waiting for about 30s and then check the work situation of the clutch. If there is still big noise, repeat the above step

VI. Clutch switch assembly

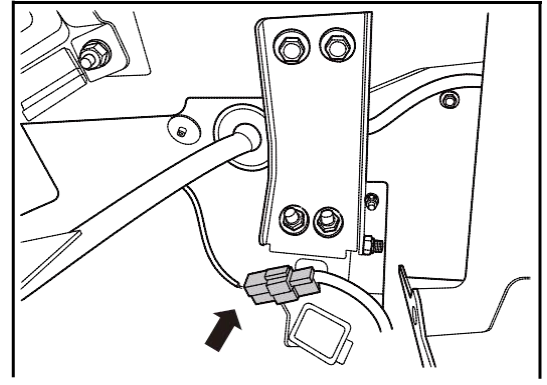
(I) Remove

1. Open the engine hatch
2. Disconnect the negative battery cable

3. Remove the lower driver's side fender body refers to the lower driver's side fender body

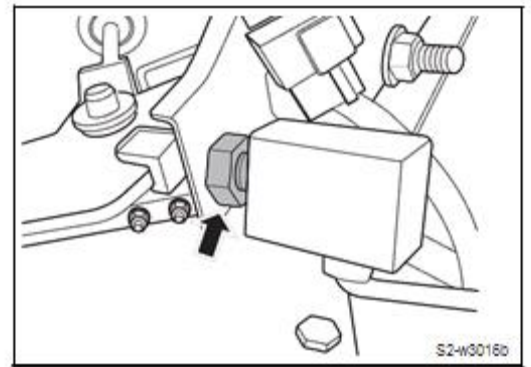
4. Remove the clutch switch assembly

- 1). Disconnect the clutch switch harness connector.
- 2). Remove the buckle connecting the clutch pedal with clutch switch harness, disconnect the clutch switch and pedal.



3) Removing the clutch switch fixed nut.

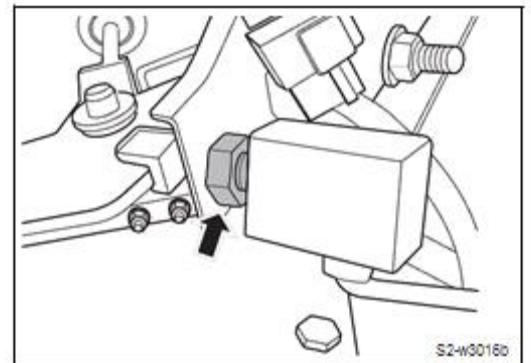
4) Remove the clutch switch.



(II) Installation

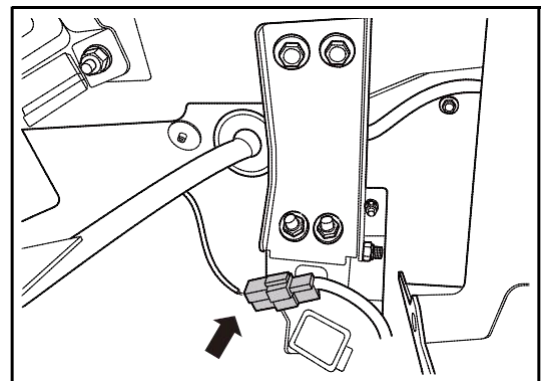
1. Install the clutch switch assembly

- 1). Place clutch switch assembly to the mounting position.
- 2) Tighten the clutch switch fixing nut.
- 3) Install the knuckle connecting clutch switch and clutch pedal



4) Connect the clutch switch harness connector.

2. Install the lower driver side fender body
3. Connect the negative battery cable
4. Close the engine hatch

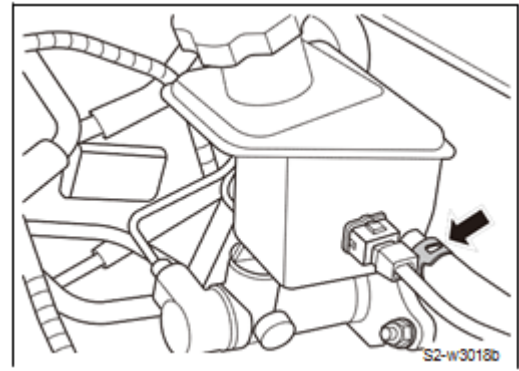


VII Clutch master cylinders and inlet pipe assembly

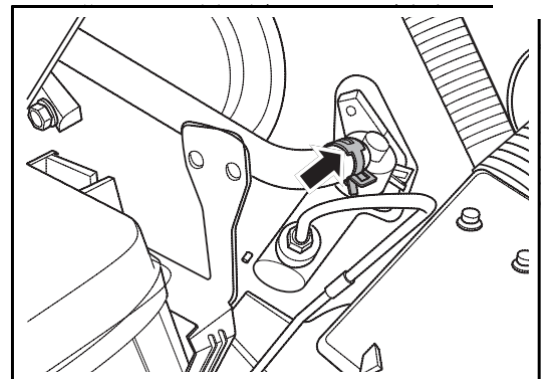
(I) Remove

1. Open the engine hatch

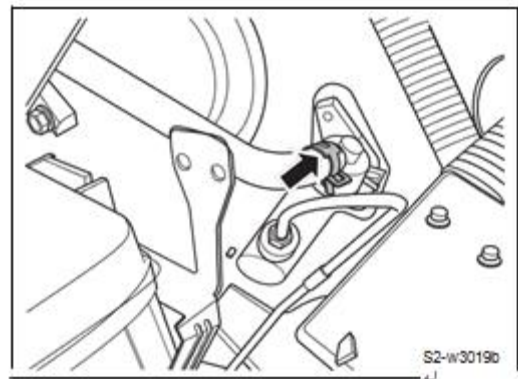
2. Drain clutch hydraulic oil, refers to clutch hydraulic oil
3. Remove the inlet pipe assembly
 - 1). Remove the clip, disengage inlet pipe assembly and brake master cylinder.



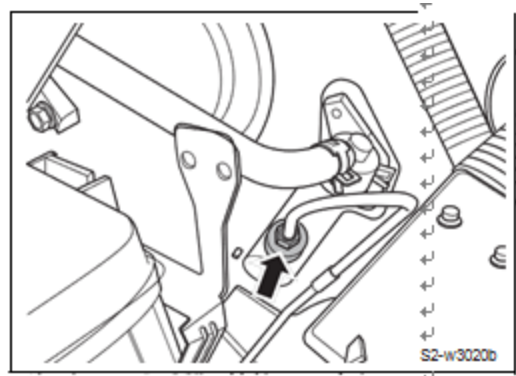
- 2). Remove the clip, disengage inlet pipe assembly and clutch master cylinder.
- 3) Remove the inlet pipe assembly.



4. Remove the clutch master cylinder
 - 1). Removing the clip, disengage inlet pipe assembly and clutch master cylinder.



- 2) Remove the flare nut and disengage the clutch hard pipe assembly - I and clutch master cylinder.



3). Remove the clamp connecting the clutch pedal and clutch master cylinders, remove the latch, disengage the clutch pedal and the clutch master cylinder.

4) Remove the two fixing nuts connecting clutch master cylinder and clutch pedal body.

5) Remove the clutch master cylinder.

(II) Installation

1. Install the clutch master cylinder

1). Place the clutch master cylinder to the installation location.

2) Install the two fixing nuts connecting clutch master cylinder and clutch pedal body.

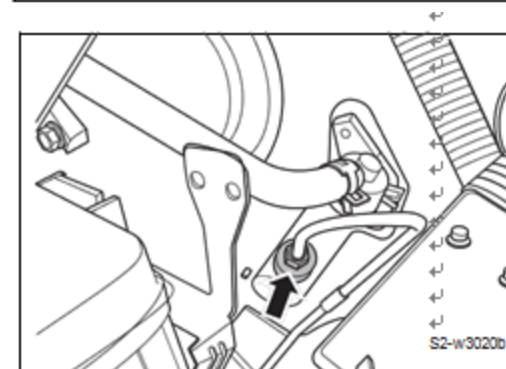
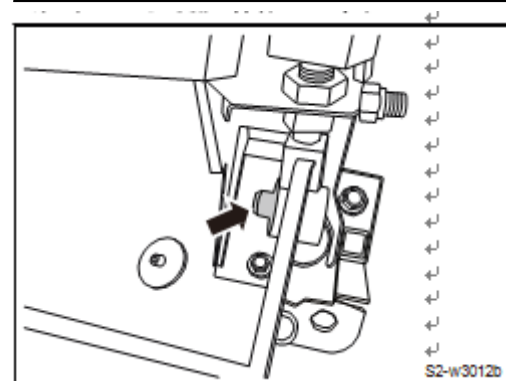
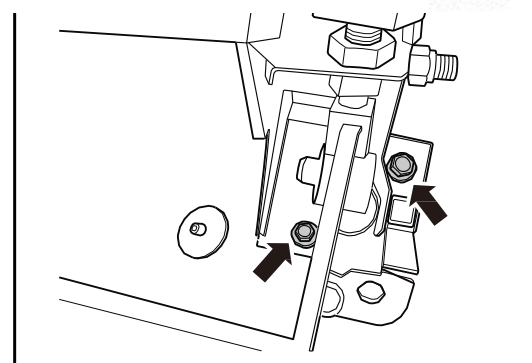
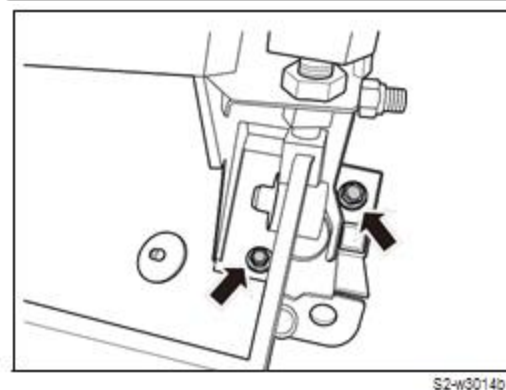
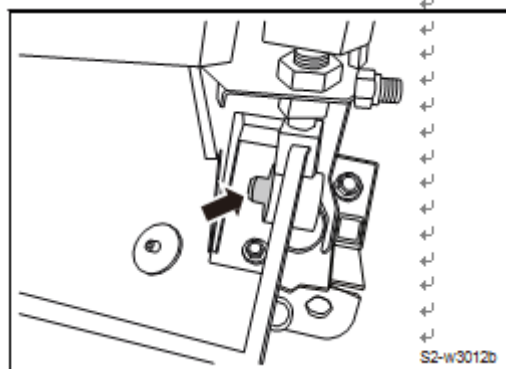
Tighten torque 20 ~ 28N • m

3) Install the lock pin, install clamp connecting clutch pedal and the clutch master cylinder.

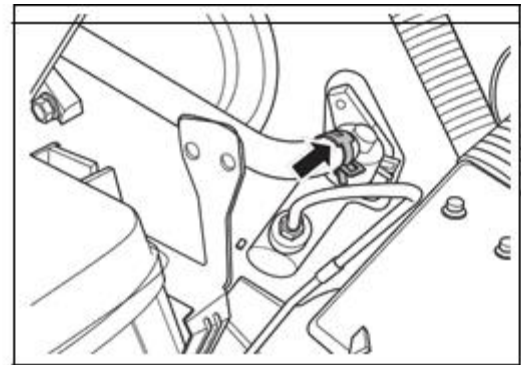
△ Note Coat low temperature grease Kunlun II on the outer surface of the front pin.

4). Install nut connecting the clutch hard pipe assembly - I and clutch master cylinder.

Tightening torque 16 ~ 18N • m



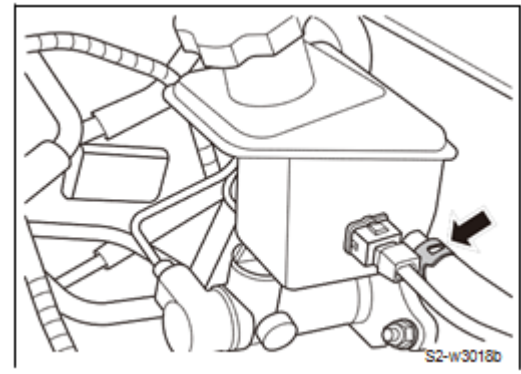
5). Install clamps to connecting clutch master cylinder inlet pipe assembly and the clutch master cylinder.



S2-W30190

2. Install the inlet pipe assembly

1). Install clamp to connect inlet pipe assembly and brake master cylinder.



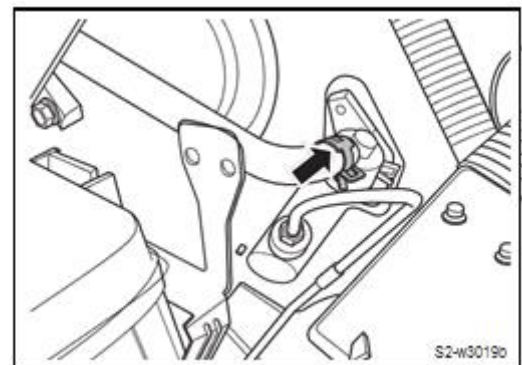
S2-W30180

2) Install clamp to connect inlet pipe assembly clutch master cylinder.

3. Fill the clutch hydraulic oil refers to clutch hydraulic oil

4. Drain clutch system refers to the clutch hydraulic oil

5. Close the engine hatch



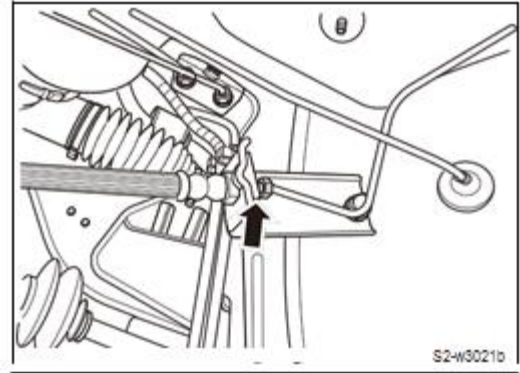
S2-W30190

VIII Clutch cylinder and the inlet pipe assembly

(I) Remove

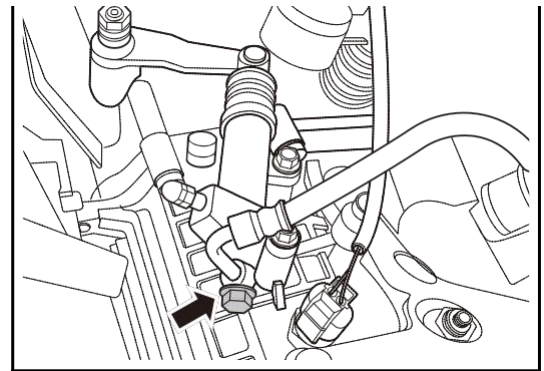
1. Open the engine hatch
2. Drain clutch hydraulic oil refers to clutch hydraulic oil
3. Remove the clutch inlet pipe assembly

1) Remove connection nut between the clutch inlet pipe and the clutch hard tube assembly



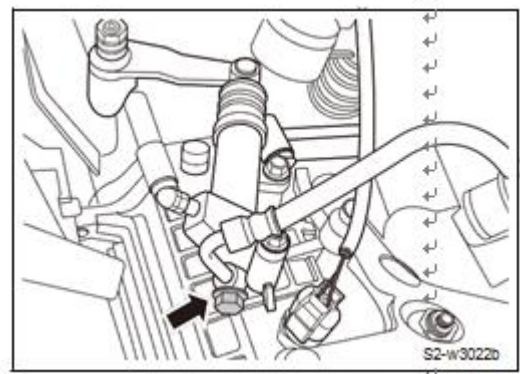
2). Remove the fixing nut connecting clutch inlet pipe and clutch working cylinder.

3). Disengage clutch inlet pipe assembly

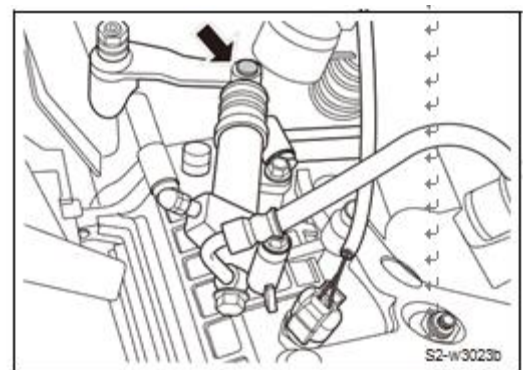


4. Remove clutch cylinder

1). Remove bolts connecting the clutch inlet pipe and the clutch cylinder.



2). Remove the latch and rivets connecting the clutch cylinder and separation fork.

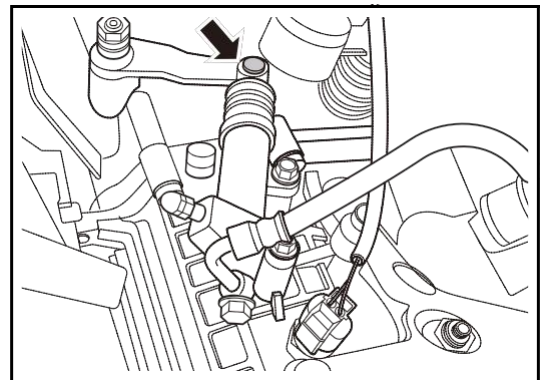
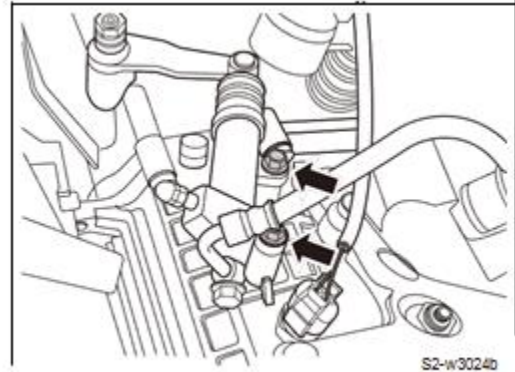


- 3) Remove the two fixing bolts connecting the clutch cylinder and the gearbox.
- 4) Remove the clutch cylinder.

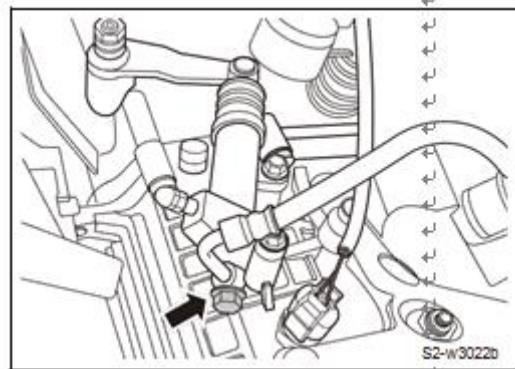
(II) Installation

1. Install clutch cylinder

- 1). Connect the latch and rivets to the clutch cylinder and separation fork

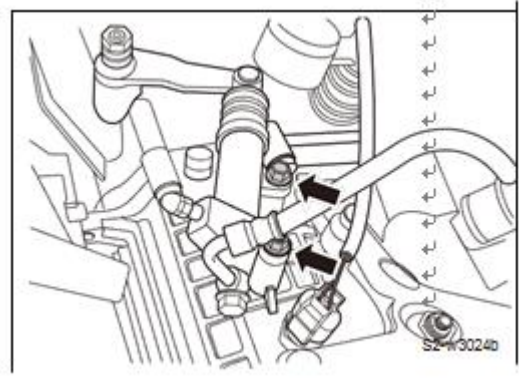


- 2). Install fixing bolts connecting the clutch inlet pipe and the clutch cylinder



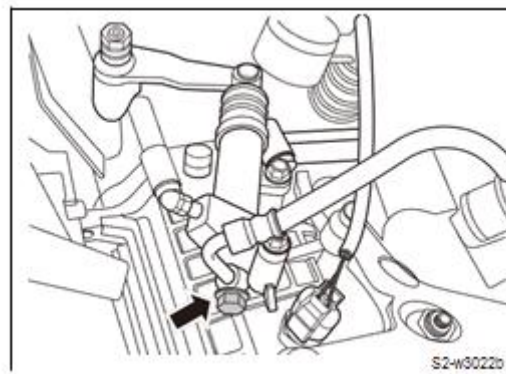
- 3). Install two fixing bolts to connect the clutch cylinder and the gearbox.

Tightening torque 14.7 ~ 21.6N • m



2. Install the clutch inlet pipe assembly

- 1) Install the fixing bolts to connect the clutch inlet pipe and the clutch cylinder.



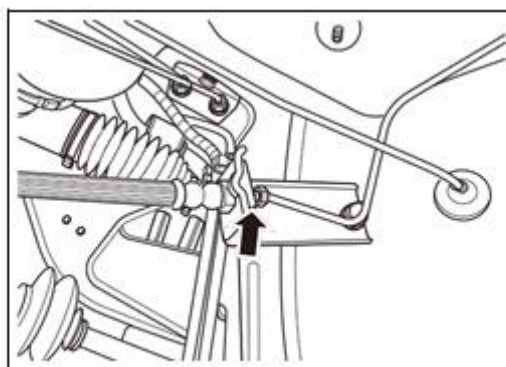
- 2) Install the connection nut between the clutch inlet pipe and the clutch hard tube assembly - I.

Tightening torque 16 ~ 18N • m

3. Fill the clutch hydraulic oil refers to clutch hydraulic oil

4. Drain clutch system refers to the clutch hydraulic oil

5. Close the engine hatch

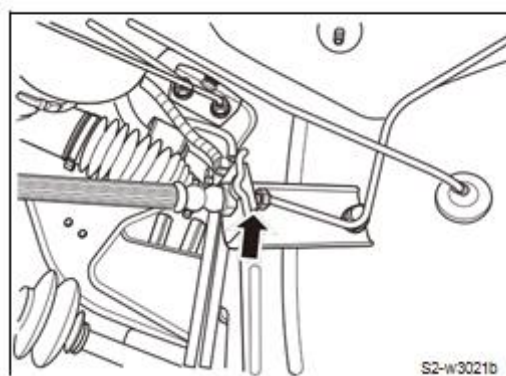


IX Clutch hard pipe assembly

(I) Remove

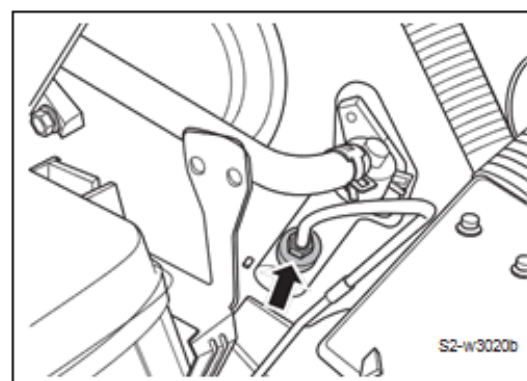
1. Open the engine hatch
2. Drain clutch hydraulic oil refers to the clutch hydraulic oil
3. Remove clutch hard tube assembly

- 1) Remove the connection nut between the clutch inlet pipe and the clutch hard tube assembly



- 2) Remove the pipe nut and the connection between the clutch hard pipe assembly and clutch master cylinder.

- 3) Remove the clutch hard tube assembly

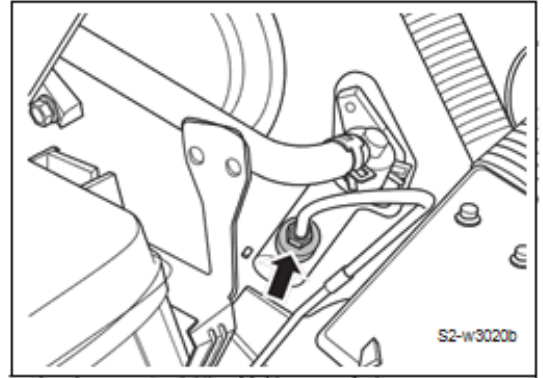


(II). Installation

1. Install the clutch hard tube assembly

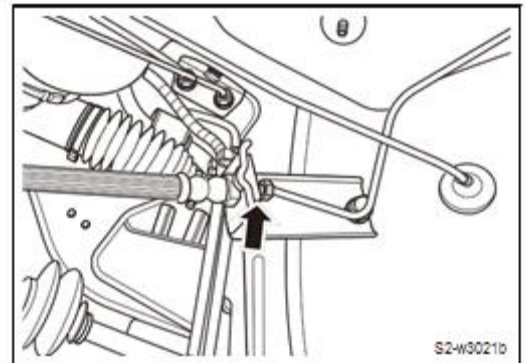
- 1) Install oil pipe nuts and remove the connection between clutch hard pipe assembly - I and clutch master cylinder.

Tightening torque 16 ~ 18N • m



- 2) Install the connection nut between the clutch inlet pipe and the clutch hard tube assembly - I

Tightening torque 20 ~ 28N • m



2. Fill the clutch hydraulic oil refers to clutch hydraulic oil

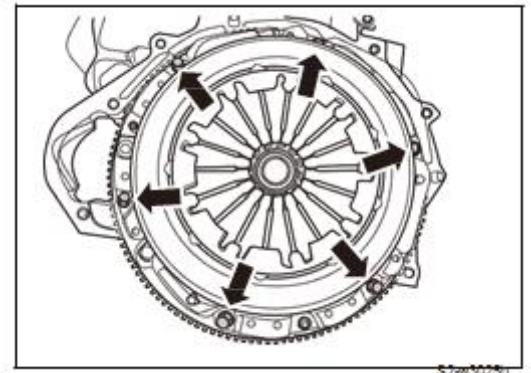
3. Drain clutch system refers to clutch hydraulic oil
4. Close the engine hatch

X Clutch cover and pressure plate assembly, clutch driven disc

(I) Remove

1. Remove the transmission assembly refers to gearbox assembly
2. Remove the clutch cover and pressure plate assembly, clutch driven disc

- 1). Remove the clutch cover and pressure plate assembly, 6 fixed bolts connecting clutch driven disc and the engine



(II) Installation

1. Install the clutch cover and pressure plate assembly, clutch driven disc

- 1) Clean the clutch friction plate and the input shaft keyway to remove grease and wear metals crumbs.

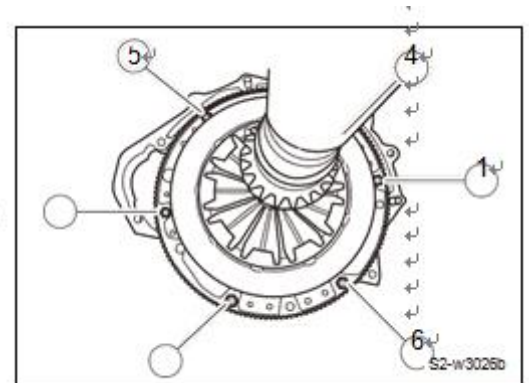
- 2) Apply grease to the input shaft keyway.

Grease: SAE J310

△ Note ensure that the grease is applied in the predetermined position, if not may lead to clutch noise, separation bad or damage. Too much oil can lead to slip or jitter.

- 3) Install the clutch cover.

- 4) Use the special tool to install clutch plates and the



clutch pressure plate.

5) As shown in Figure through 1-2-3-4-5-6 sequence tighten the clutch fixing bolts successively and evenly.

Tightening torque $20 \sim 28\text{N} \cdot \text{m}$

△ Note tighten each bolt 1 to 2 laps in turn progressively.

2. Install the transmission assembly

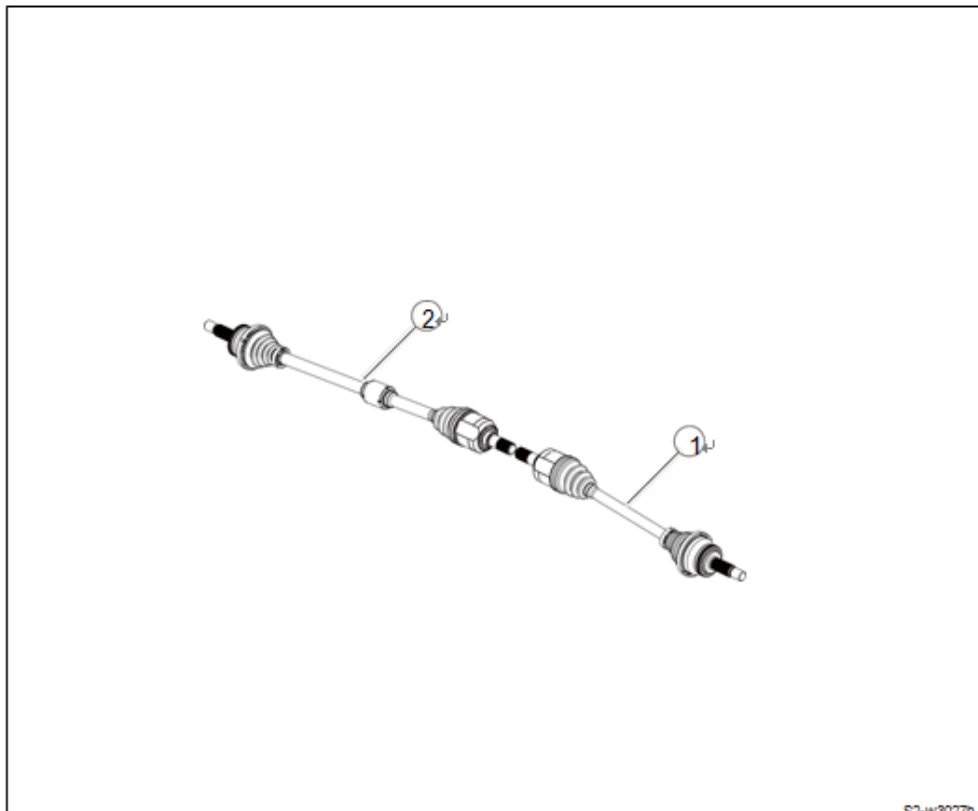
Drive shaft

I. Overview

(I) Structure summary

Drive shaft is located above the front sub frame and combined with left drive shaft assembly and right drive shaft assembly, who transmit the transmission output torque and speed to the wheels. The inside of the drive shaft is connected to gearbox differential by spline, by the inside universal joints can slide axially inside the steering wheel in order to compensate for the change in length caused by turning and jitter; through the outer universal joint it can have a large rotation angle and through a spline at the end of the shaft, connect hub inner ring and lock with self-locking nuts.

Drive shaft assembly structure



1. Left front drive shaft assembly 2. Right front drive shaft assembly

(II) Torque parameters

No	Item	Torque (N m)	Remark
1	Drive shaft self-locking nuts	240~260	
2	Lower arm ball head and knuckle connection nut	100~120	
3	knuckle and shock absorber assembly connection nut	100~120	
4	speed sensors	10~15	

(III) Maintenance precaution
1. Maintenance precaution related to the drive shaft

- 1). Knuckle and other non-repair parts are not removable.
- 2) Operate in a clean work surface.
- 3) Clean the outer parts surface before assembling and disintegration.
- 4) When working, take care not to contaminate the parts and prevent outer matter from entering. The disintegrated components must be carefully reassembled in the correct order. If the work is interrupted, cover the parts with clean cover.
- 5) Use paper cloth to prevent the use of fiber debris attached to the components.

- 6) Clean the disintegrated components (except rubber parts) with kerosene and dry with a paper or cloth.

2. Things to be noted when check, repair system or replace parts.

- 1) Check whether the fastener torque is specified after assembly.
- 2) Carry out necessary position checks after assembly.
- 3) Do not reuse the disposable parts.
- 4) Check thoroughly before repair or replace parts.

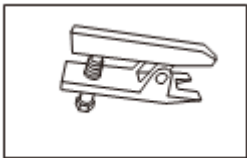
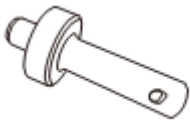
(IV) Maintenance parameters
Drive shaft

Item		outside	inside
Drive shaft	universal joint type	GI	AC
	maximum allowable angle	23 °	45 °

Lubrication grease

Item		Lubrication grease	quantity
Drive shaft	GI	GRBN-1000	120 ±10g
	AC	CVJM-2008J	120 ±10g

(V) Special tools

No	Tool	Outer look	Description
1	Japanese-style ball puller		Remove ball head
2	Differential oil seal installation tool		JAC-T6B025 S2-0610-9025-HL

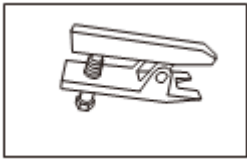
II. Fault diagnosis

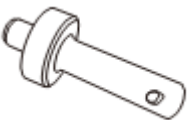
(I) Fault diagnosis table

No	Failure Cause	Failure Cause analysis	Solution	Remark
1	Vehicle deviation	shaft knuckle worn	replace	
		wheel bearing wear, friction or pop sound	replace	
		front suspension and steering defect	Adjust and replace	
2	Vibration	shaft wear, damaged or bent	replace	
		shaft and hub splines loose or broke	replace	
		wheel bearing wear, friction or pop sound	replace	
3	Beating	wheel unbalance	Adjust and replace	
		front axle steering defect	Adjust and replace	
4	Loud noise	shaft wear, damaged or bent	replace	
		hub splines friction	replace	
		Drive shaft hub end spline wear	replace	
		wheel bearing wear, friction or abnormal sound	replace	
		Wheel hub nut loose	Adjust and replace	
		front suspension and steering defect	Adjust and replace	

III. Drive shaft

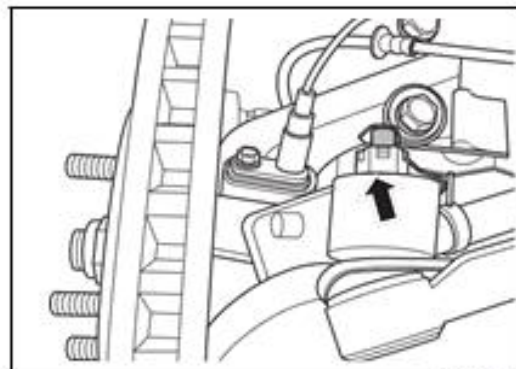
(I) Special tools

No	Tool	Outer look	Description
1	Japanese-style ball puller		Remove ball head

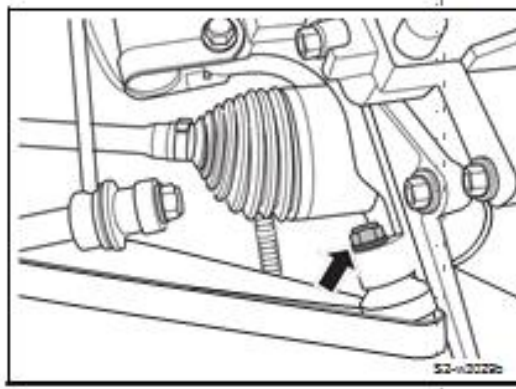
2	Differential oil seal installation tool		JAC-T6B025 S2-0610-9025-HL
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(II) Remove

1. Open the engine hatch
2. Remove the wheels refers to the wheels
3. Remove the drive shaft
 - 1). Remove cotter pin and hex slotted nuts connecting to the knuckle and tie rod.
 - 2) Separate connection between the knuckle and steering tie rod.

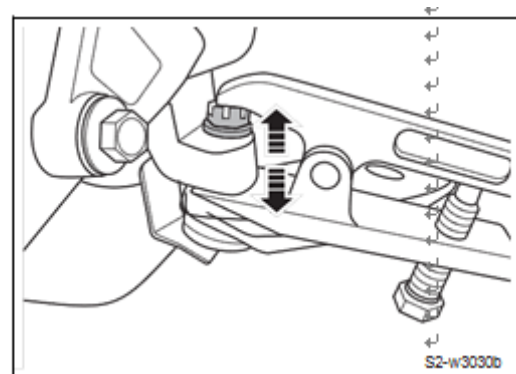


- 3) Remove the cotter pin and slotted nut connecting the lower arm and knuckle.

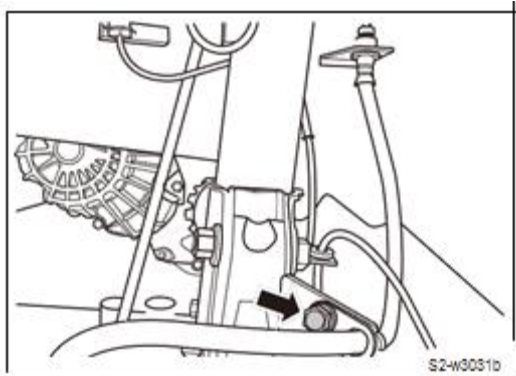


- 4) Detach the lower arm and knuckle connection with a special tool.

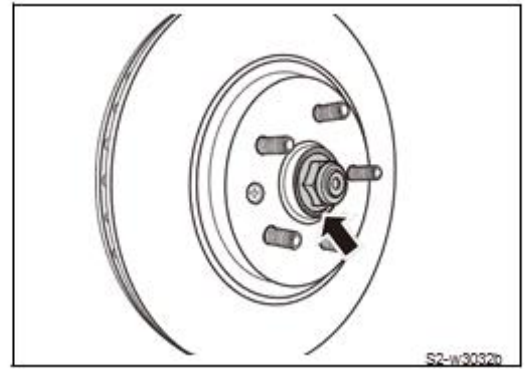
△ Note avoid violent demolition.



- 5) Remove the front brake hose and connect to the front strut assembly bracket bolts. Disengage the connection of the front brake hose and the front pillar.



6) Remove the drive shaft self-locking nuts

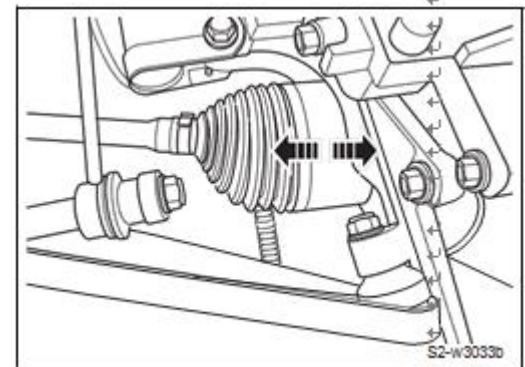


7) Tap the shaft with a hammer (or a suitable tool) and wood, make the drive shaft and front wheel hub assembly do relative activity.

△ Note if the hub and the drive shaft cannot be separated, use puller (or a suitable tool).

8). Disengage the drive shaft and the front hub assembly.

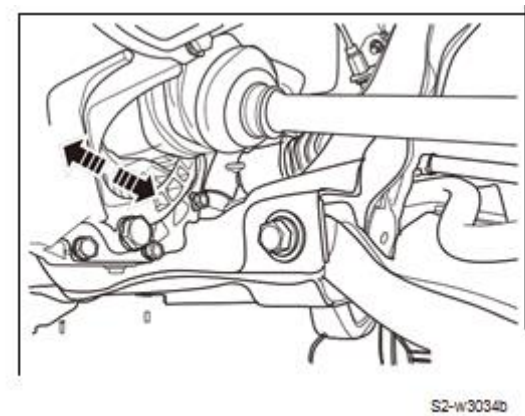
△ Note avoid pulling the brake hose.



9) Insert a lever between the transmission housing and the joint housing; separate the drive shaft from the transmission.

△ Note support housing (joint assembly), shafts and other components of the drive shaft before putting down.

△ Note Do not place a too big angle with the drive shaft universal joint. Avoid excessive stretching, prevent cage shedding.



(III) Check

1. Check all parts of the drive shaft

1) Check whether there is damage on left and right drive shaft splines.

2) Check whether there is damage around the drive shaft dust cover or securely installed.

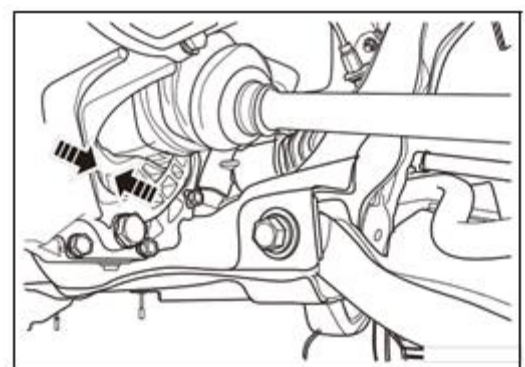
3) Check whether there is clamp damage or missing on the moving ends of the left and right shaft.

4) Universal joint should be able to ride in any direction around the drive shaft.

(IV) Installation

1. Install the drive shaft

1). Apply gear oil on the drive shaft splines.



2) Slightly rotate the drive shaft

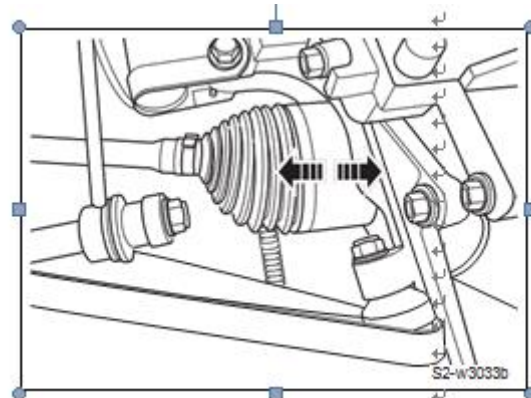
3) Match mobile end outer spline with the differential inner spline movement, then further push, install the drive shaft mobile end to the transmission differential.

△ Note the clamp of the mobile end must be assembled in position.

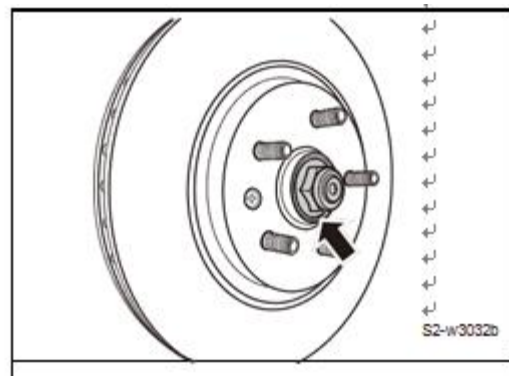
△ Note the clamp open side should be downward.

4) Install the shaft fixed end of on the front hub assembly.

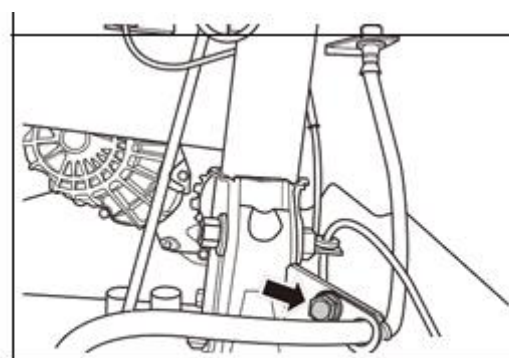
△ Note self-locking nuts of the fixed end must be assembled in position.



5) Install the shaft self-locking nuts. Tightening Torque 240 ~ 260N • m

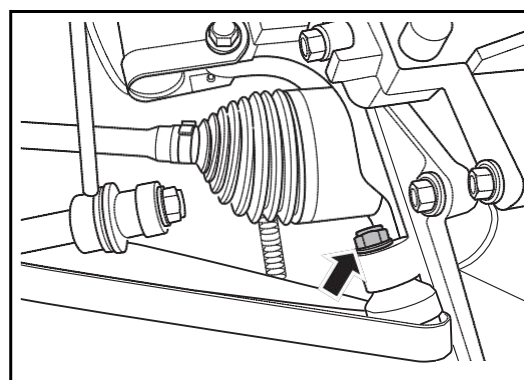


6) Install the front brake hose to the front shock absorber welded bracket bolts. Tightening torque 20 ~ 25N •



7) Install the cotter pin and slotted nut connecting the lower arm and knuckle.

Tightening torque 60 ~ 72N • m



8) Install the cotter pin and hex slotted nuts connecting the steering and knuckle tie rod.

Tightening torque 50 ~ 55N • m

2. Install the wheel
3. Check the wheel alignment refers to the wheel alignment
4. Close the engine hatch

IV. Drive shaft seal

(I) Remove

1. Open the engine hatch
2. Remove the wheels refers to the wheels
3. Remove the drive shaft refers to the shaft
4. Remove the drive shaft seal
 - 1). By using a pry bar to pry the outer seal lip, disassemble the differential oil seal.

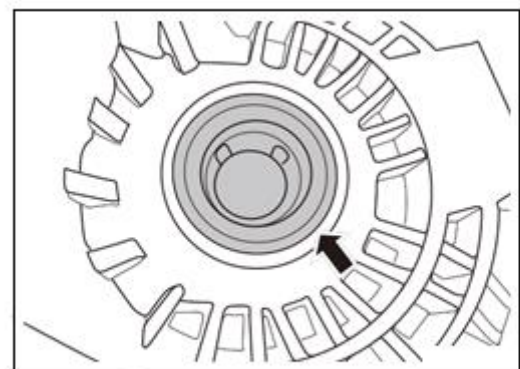
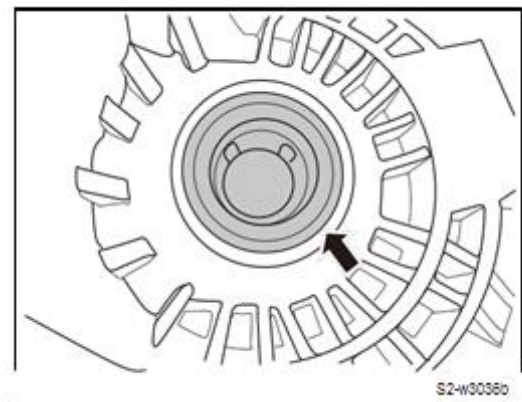
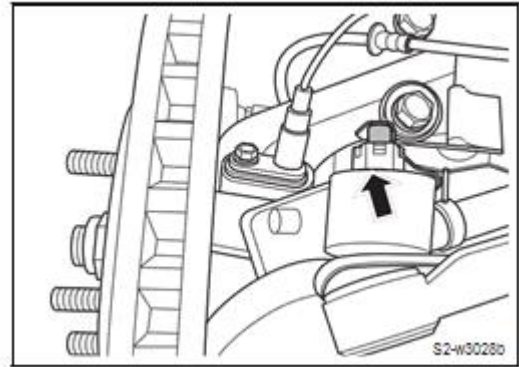
△ Note when use a pry bar to pry the seal, it should be particularly careful not to damage the transmission casing and seals.

(II) Check

1. Check the seal for cracks, damage and grease leakage.
2. Check the dust cover for cracks, damage and grease leakage.
3. If there is non-compliance situation, replace the seals.

(III) Installation

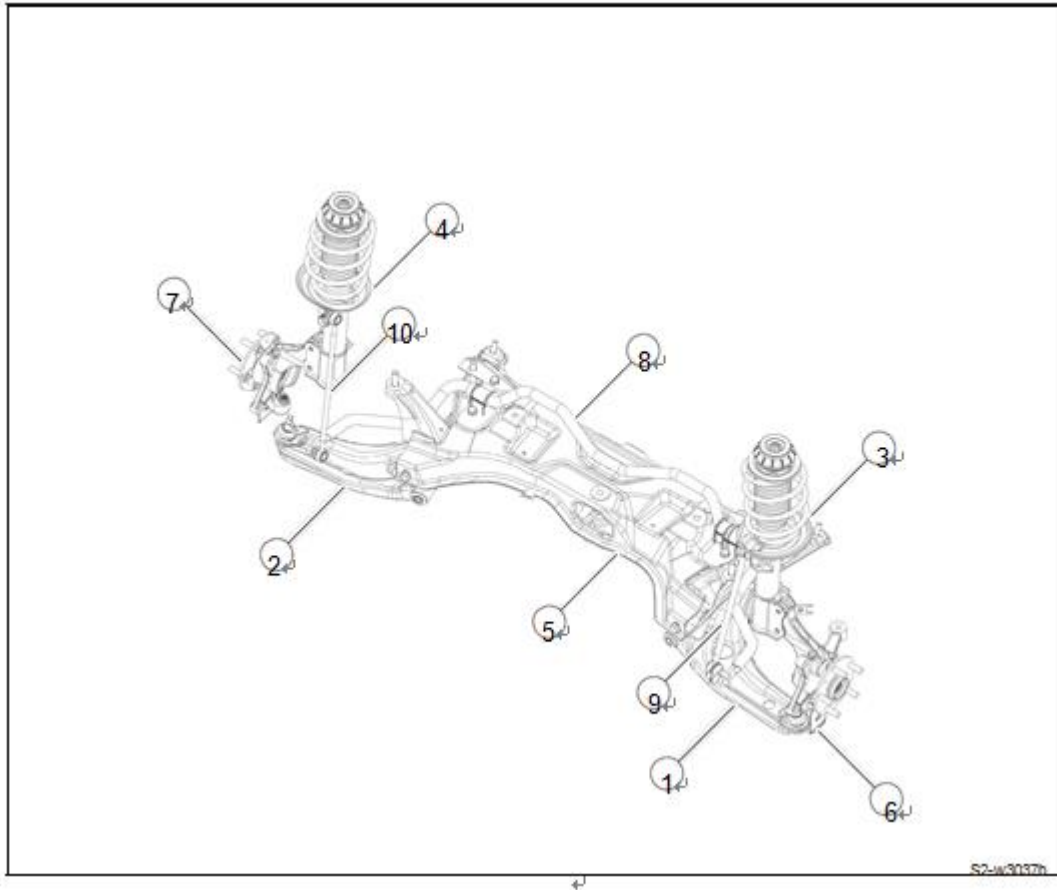
1. Install the shaft seals
 - 1). Apply the transmission oil on the new differential lip seal assembly.
 - △ Note replace a new seal
 - 2). By using special tools to install the new differential seal components.
2. Install the drive shaft
3. Install the wheel
4. Close the engine hatch



Front suspension

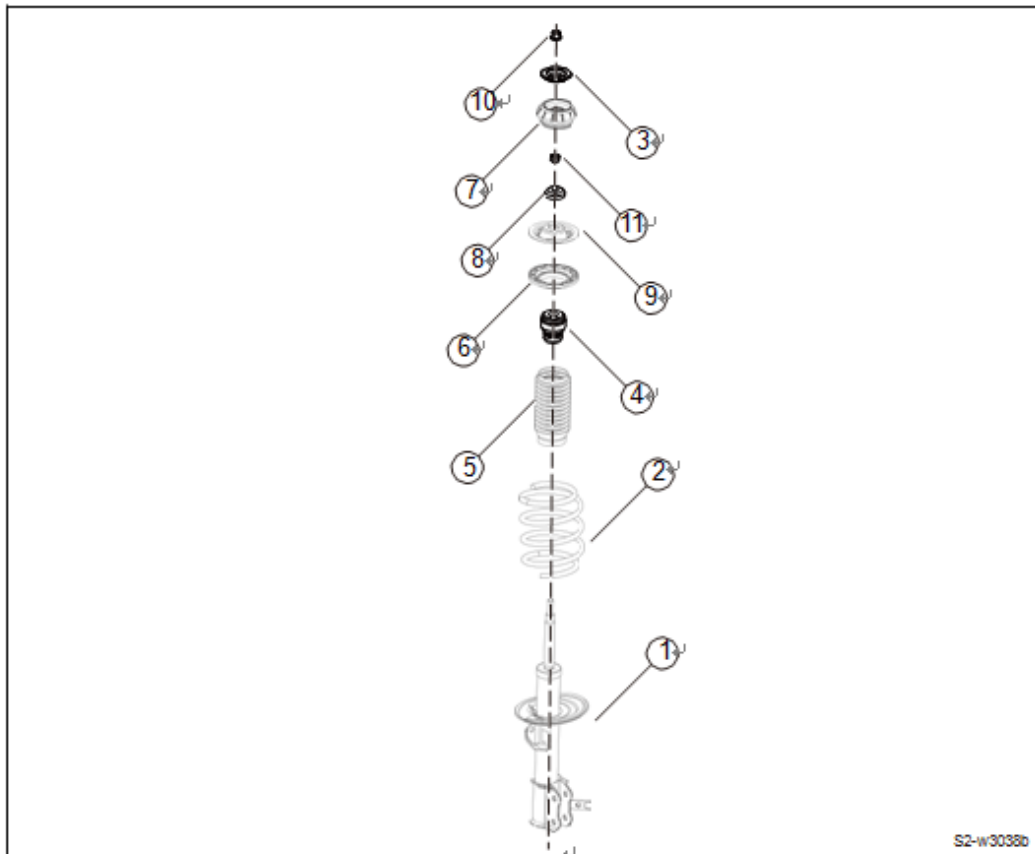
I. Overview

(I) Structure Summary



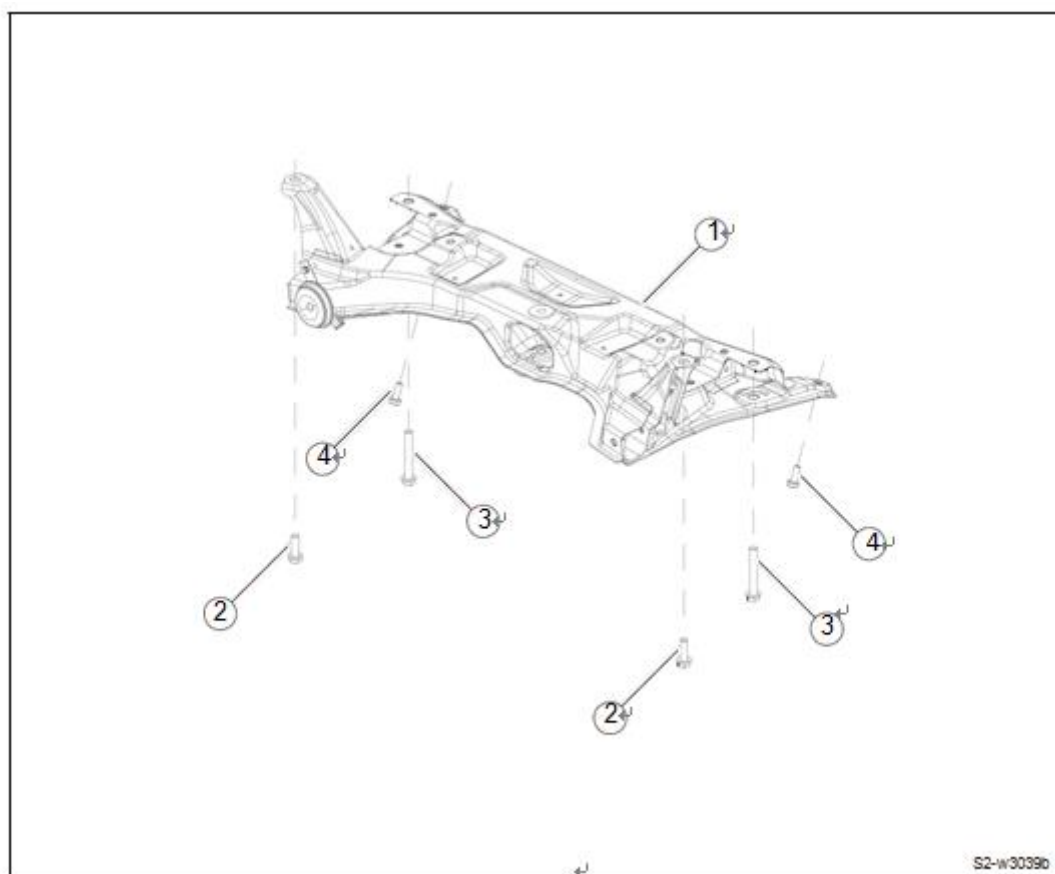
1. The left lower arm assembly
2. The right lower arm assembly
3. The left front shock absorber and coil spring support assembly
4. The right front shock absorber and coil spring support assembly
5. The sub-frame assembly
6. The left front wheel hub assembly
7. The right front wheel hub assembly
8. Stabilizer bar
9. Left ball pin rod assembly
10. Right-ball rod assembly

Front shock absorbers and coil springs support assembly structure



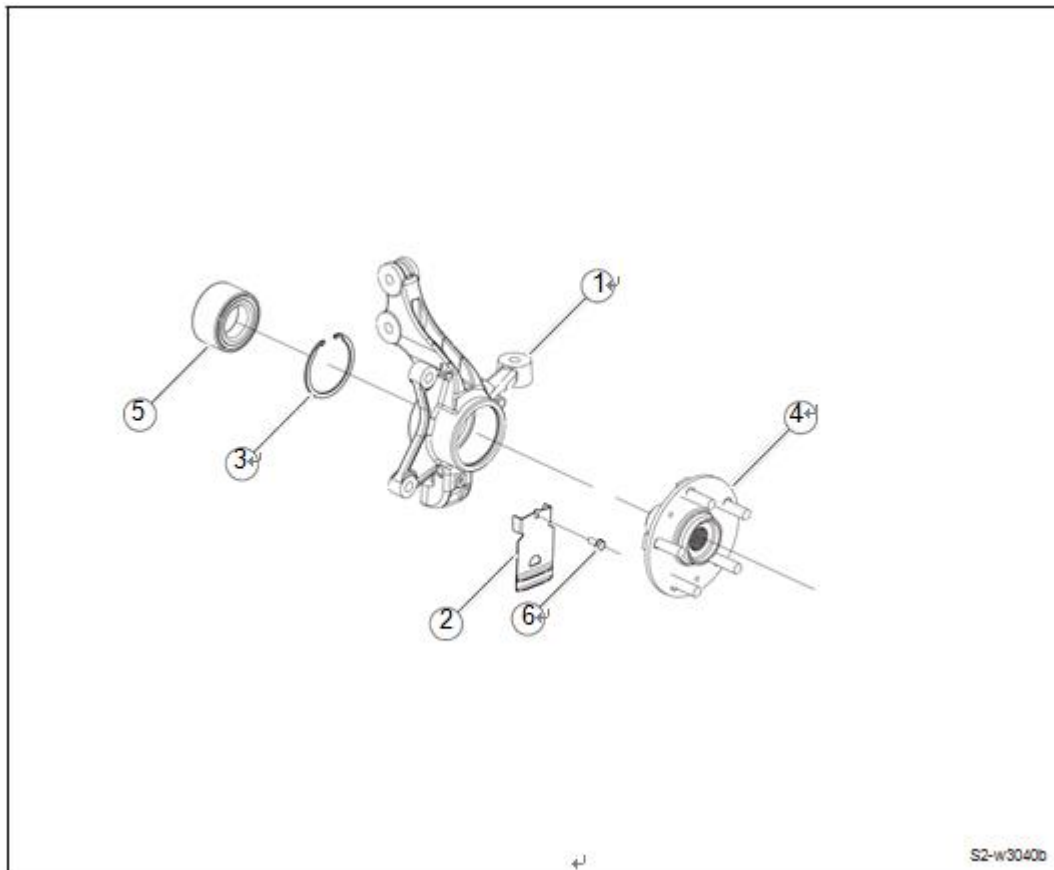
1. Front shock absorber assembly
2. The front coil spring
3. The decorative cover
4. The buffer block
5. Dust cover
6. Upper spring cushion
7. Upper installation buffer block
8. Damper bearing
9. Upper spring seat
10. Self-locking nuts
11. (Fixed bearing) Nuts

Sub-frame assembly structure



1. Sub-frame assembly
2. Hex flange locking bolt pad assembly
3. Hex flange locking bolt pad assembly
4. Hex flange locking bolt pad assembly

Front hub assembly structure



- 1. Knuckle
- 2. Fender
- 3. Clamp
- 4. Flange plate
- 5. Bearing
- 6. (Fixed fender) bolt

(II) Technical parameters

Item			parameters and specifications	
Front suspension mode			McPherson independent front suspension form with coil	
Shock absorber	model		Bidirectional hydraulic cylinder	
	stroke		140mm	
	Damping force	pill	806N±125N (0.3m/s)	
		press	443N±91N (0.3m/s)	
Coil spring			free height : 326mm (reference)	Color rematk: yellow and white stripe
Wheel alignm ent (no load)	Wheel toe		3.75'±6.75'	
	Wheel camber		24'±30'	
	Kingpin inclination		10.5 °±1 °	
	Kingpin caster		3.65 °±0.75 °	
	Kingpin offset		-3.8mm	

(III) Torque parameters

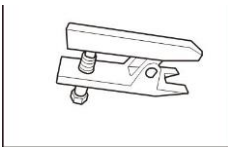
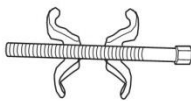
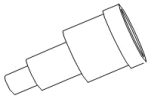
No	Item	Torque (N m)	R
1	front stabilizer bar mounting bracket and the sub-frame fixing bolts	60~72	
2	front shock absorber and body assembly nut	60~72	
3	front shock absorber self-locking nut	50~70	
4	front shock absorber and steering knuckle connecting bolt	100~1	
5	stabilizer link assembly and stabilizer bar / damper assembly connecting nut	60~72	
6	lower arm ball pin and lower arm connecting nut	60~70	
7	lower arm front liner and sub frame connecting bolt	130~1	
8	lower arm rear liner and sub frame connecting bolt	130~1	
9	Engine rear suspension and front sub frame connecting bolt	130~1	
10	front sub frame front mounting nut	110~1	
11	front sub frame rear mounting nut	60~72	
12	drive shaft and front wheel hub assembly self-locking nut	240~2	

(IV) Maintenance precaution

1. When install suspension or rubber liner, final tightening must be carried out under the condition that the tire is on ground and with no-load.
2. After finish suspension components maintenance, be sure to check wheel alignment.
3. The oil will shorten the life of the rubber liner. Be sure to clean the spilled oil.
4. The no-load condition is the condition that fuel, engine coolant and lubricant are normally raised, and spare tire, jack, hand tools and mats are in designated positions.

5. The locking nut should not be reused. Always use a new nut during installation. When replacing, before tighten the locking nut, do not wipe anti-rust oil on the locking nut.

(V) Special tools

No.	Tool	Outlook	Description
1	Japanese-style ball puller		Remove ball head
2	Damping spring puller		Remove, install damper spring
3	Hub Installation Tool		Install front and rear wheel hub

II. Fault diagnosis

(I) Fault diagnosis table

No.	Failure	Failure Analysis	Solution	Remark
1	Heavy steering	wheel alignment improper	Adjust	
		rotation beyond lower arm ball head	replace	
		tire pressure too low	charge air	
		With no power to steer	Maintain or replace	
2	Improper return	Front wheel alignment improper	Adjust	
		Shock absorber fault	Maintain or replace	
		anti-roll bar worn or damaged	replace	
		coil spring worn or damaged	replace	
		Lower arm liner worn	replace	
3	Tire worn abnormal	Front wheel alignment improper	Adjust	
		Tire pressure too low or too high	Adjust pressure	
		Shock absorber fault	Maintain or replace	
4	Vehicle deviation	front wheel alignment improper	adjust or replace	
		Lower arm ball head connector turn without enough resistance	replace	
		Lower arm liner worn or loosen	replace	

No.	Failure	Failure Analysis	Solution	Remark
5	vehicle unilateral deviation	improper front wheel alignment	adjust or replace	
		Lower arm ball head connector turn	Replace	
		Lower arm bent	Replace	
		coil spring worn or damaged	Replace	

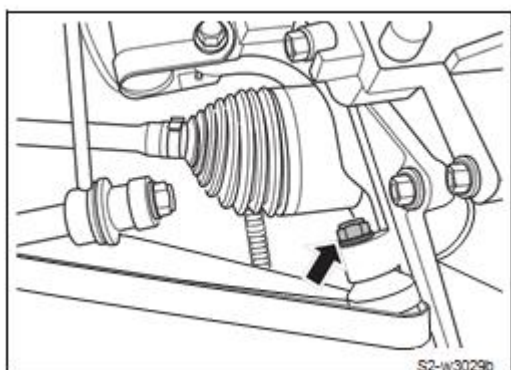
6	Steering wheel shimmy	improper front wheel alignment	adjust or replace	
		Lower arm ball head connector turn	Replace	
		Lower arm liner loose or worn	Replace	
		shock absorber fault	maintain or replace	
		Anti-roll bar worn or damaged	Replace	
		coil spring worn or damaged	replace	
7	vehicle sagging	coil spring worn or damaged	replace	
		shock absorber fault	maintain or replace	

III. Lower arm assembly

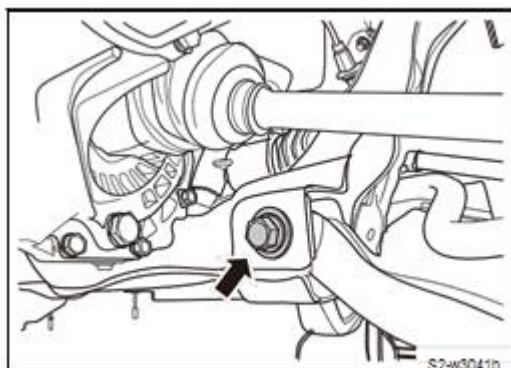
(I) Remove

△ Note to maintain wheel balance, before removing the tire, mark the relative positions of the wheel.

1. Remove the wheels refers to the wheels
2. Remove the lower arm assembly
 - 1) Remove the cotter pin and slotted nut connecting the lower arm and knuckle.

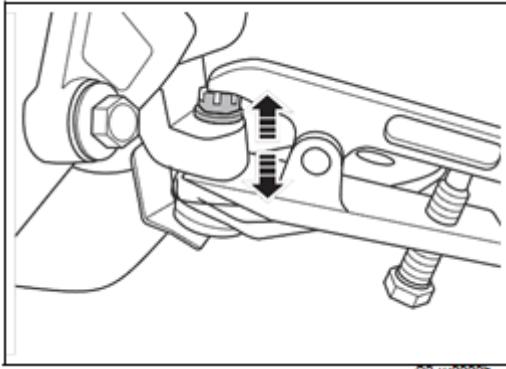


- 2). Remove the front connection bolt between the lower arm assembly and front sub frame.

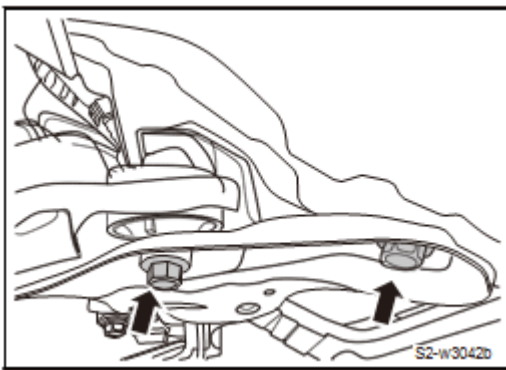


- 3). Disengage the lower ball pin and the joint connection with a special tool.

△ Note to avoid violent demolition.



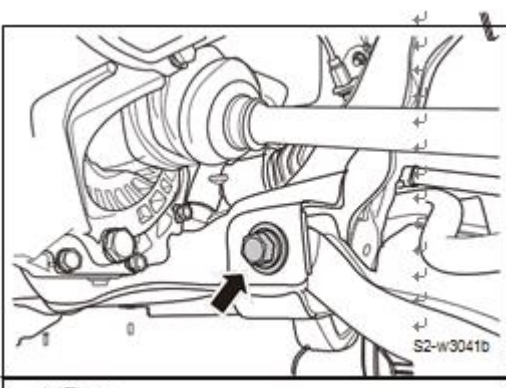
- 4) Remove front connection bolt between the lower arm assembly and front sub frame.



(II) Installation

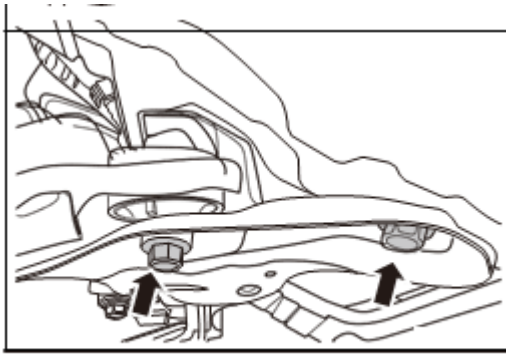
1. Install the lower arm assembly
 - 1) Place the lower arm assembly to the mounting position.
 - 2) Install front connection bolt between the lower arm assembly and front sub frame.

Tightening Torque 130 ~ 150N • m



- 3) Install rear connection bolt between the lower arm assembly and front sub frame.

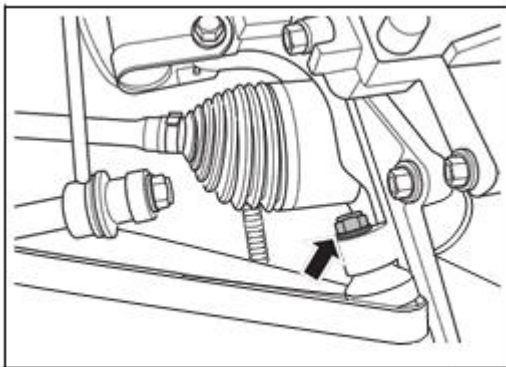
Tightening Torque 130 ~ 150N • m



S2-w3042b

- 4). Install the cotter pin and slotted nut connecting the lower arm and knuckle

Tightening torque 60 ~ 72N • m



S2-w3029a

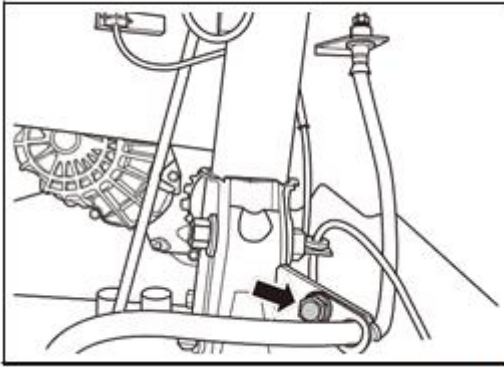
2. Install the wheel

IV. Front shock absorber and coil spring support assembly

(I) Remove

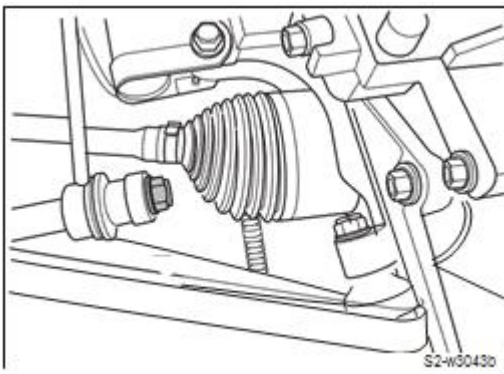
△ Note To maintain wheel balance, before removing the tire, mark the relative positions of the wheel.

1. Open the engine hatch
2. Remove the wheels refers to the wheels
3. Remove the front shock absorber and coil spring support assembly
 - 1). Remove the fixing bolt connecting the front shock absorber in the central of the front brake hose, disengage the connection between the front brake hose and the front shock absorber.
 - 2). Disengage a fixing point connecting the front wheel speed sensor harness and front shock absorber.



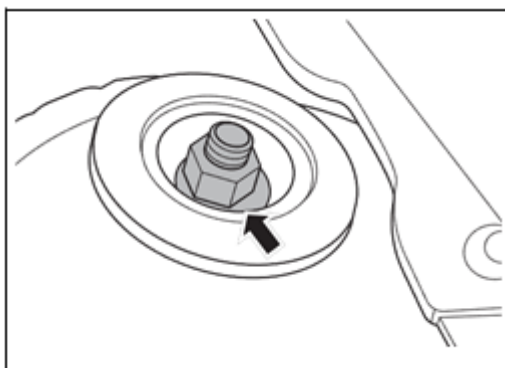
S2-W3031b

3). Remove a fixing nut connecting the front shock absorber assembly and the left damper ball lever; disengage the front shock absorber assembly and the left damper ball lever.



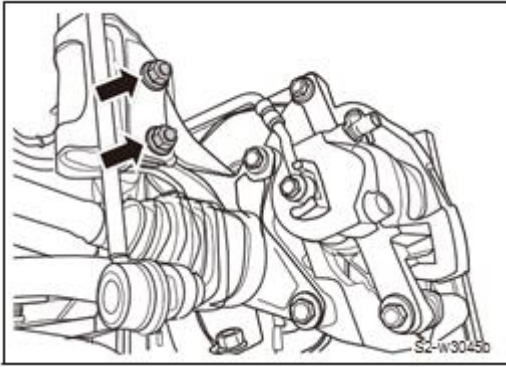
S2-W3043b

4) Remove a self-locking nut connecting front shock absorber and coil springs support assembly nut and the body.



S2-W3044b

5) Remove two bolts and nuts connecting the front shock absorber assembly and the front knuckle.



6) Remove the front shock absorber and coil spring support assembly from the wheel cover side.

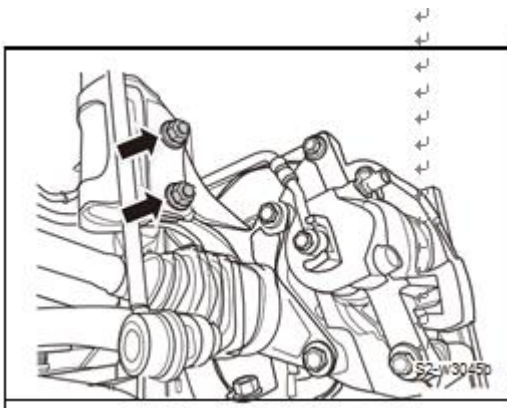
(II) Installation

1. Install the front shock absorber and coil springs support assembly

1) Place the front shock absorber and the coil spring support assembly to the mounting position.

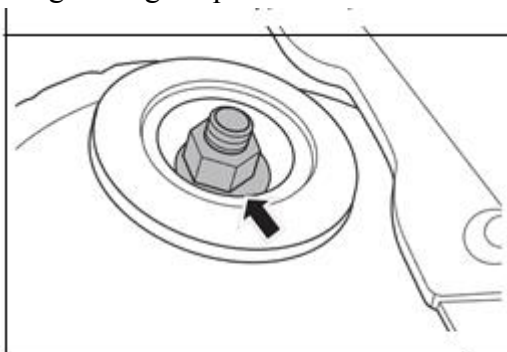
2) Install two bolts and nuts connecting the front shock absorber assembly and the front knuckle.

Tightening Torque 100 ~ 120N • m



3) Inset all a self-locking nut connecting front shock absorber and coil springs support assembly nut and the body.

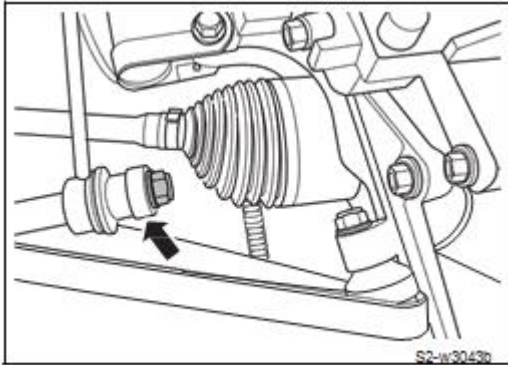
Tightening torque 60 ~ 72N • m



S2-W30440

- 4) Install a fixing nut connecting the front shock absorber assembly and the left ball pin lever.

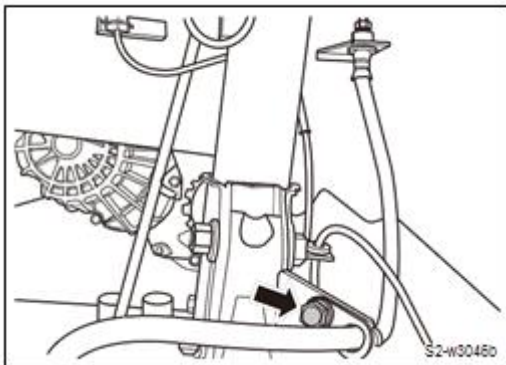
Tightening torque 55 ~ 65N • m



- 5) Connect a fixing-point connection between the front wheel speed sensor harness and front shock absorber.

- 6) Install the fixing bolt connecting the central of the front brake hose and the front shock absorber.

Tightening torque 55 ~ 65N • m



2. Install the wheel

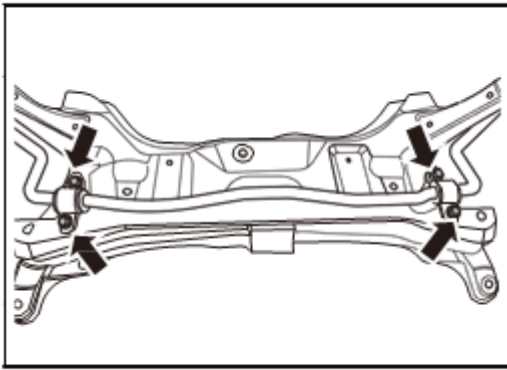
3. Close the engine hatch

V. Stabilizer bar

(I) Remove

△ Note To maintain wheel balance, before removing the tire, mark the relative positions of the wheel.

1. Remove the left front wheel refers to the wheel
2. Remove the right front wheel refers to the wheel
3. Remove the stabilizer bar on the front sub frame and steering gear assembly refers to the front sub frame assembly
4. Remove the stabilizer bar
 - 1). Disassemble the four hex flanges bolt pad connecting stabilizer bar and front sub frame.
 - 2) Remove the stabilizer bar fixing bracket.
 - 3) Remove the stabilizer bar liner.
 - 4) Remove the stabilizer bar.



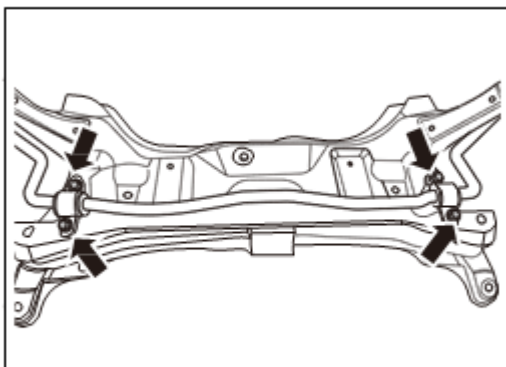
S2-w3047b

(II) Installation

1. Install the stabilizer bar

- 1) Place the stabilizer bar to the front sub frame mounting position.
- 2) Place the stabilizer bar liner, stabilizer bar mounting bracket; tighten the four hex flanges bolt pad connecting stabilizer bar and front sub frame.

Tightening torque 60 ~ 72N • m



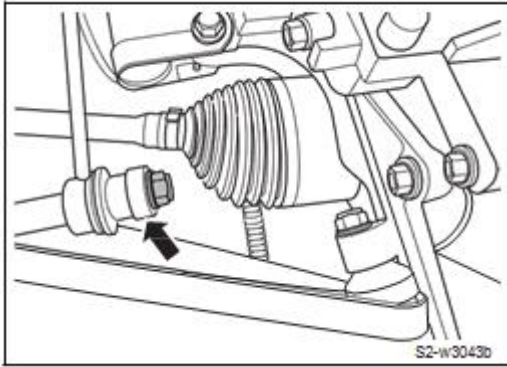
S2-w3047b

2. Install the stabilizer bar of the front sub frame and steering gear assembly
3. Install the left front wheel
4. Install the right front wheel

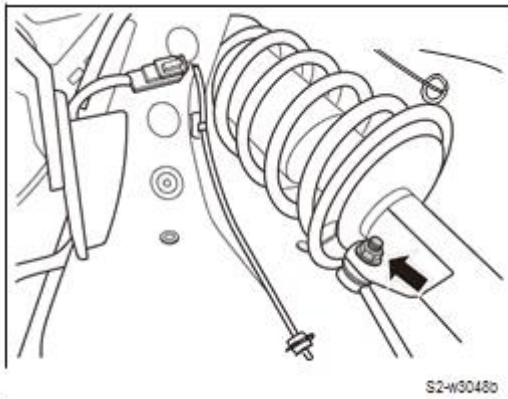
VI. Left ball pin rod assembly

(I) Remove

1. Lift vehicle
2. Remove the left ball pin rod assembly
 - 1). Remove a self-locking nut connecting the left ball pin rod assembly and stabilizer bar; disengage the left ball pin rod assembly and stabilizer bar connection.



- 2). Remove a self-locking nut connecting the left ball pin rod assembly and the front shock absorber assembly; disengage the left ball pin rod assembly and the front shock absorber connection.



- 3) Remove the left ball pin rod assembly

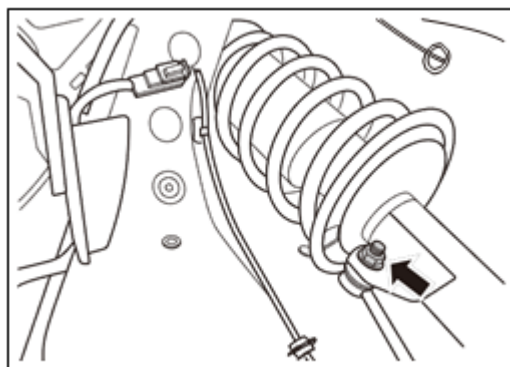
(II) Installation

1. Install the left ball pin rod assembly

- 1) Install a self-locking nut connecting the left ball pin rod assembly and front shock absorber assembly.

Tightening torque 55 ~ 65N • m

△ Note self-locking nut cannot be reused, it must be replaced with new ones.

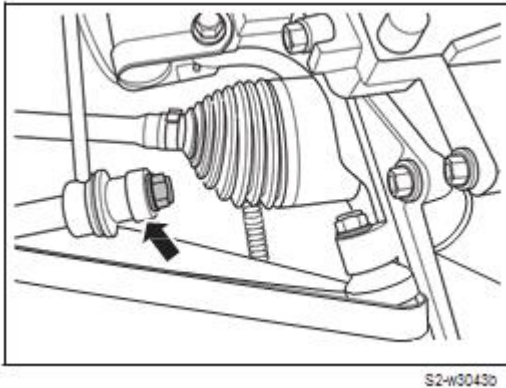


- 2) Install a self-locking nut connecting the left ball pin rod

assembly and stabilizer bar.

Tightening torque 55 ~ 65N • m

△ Note self-locking nuts cannot be reused, it must be replaced with new ones.

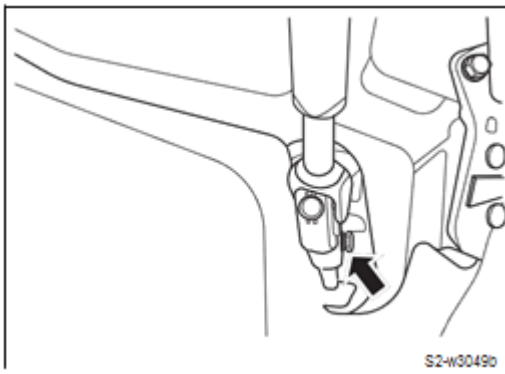


2. Lower the vehicle

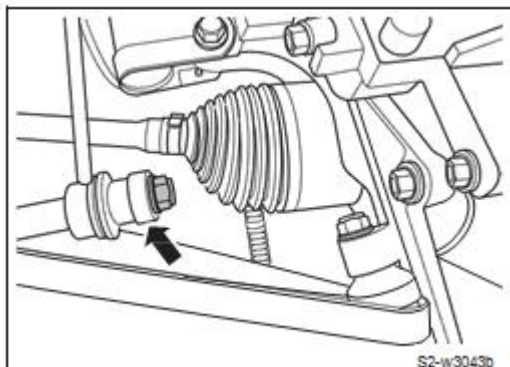
VII. Front sub frame assembly

(I) Remove

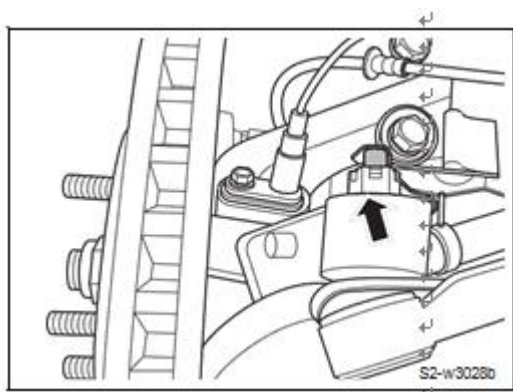
1. Remove the left front wheel refers to the wheel
2. Remove the right front wheel refers to the wheel
3. Remove the left lower arm assembly refers to the lower arm assembly
4. Remove the right lower arm assembly refers to the lower arm assembly
5. Remove the rear suspension assembly refers to the rear suspension assembly
6. Remove the stabilizer bar of the front sub frame and diverter assembly
 - 1). Remove a mounting bolt connecting the steering shaft with a universal joint assembly and diverter.



- 2) Remove a self-locking nut connecting the left ball pin rod assembly and stabilizer bar.



- 3) Remove a cotter pin and slotted nut connecting the knuckle and tie rod.



- 4). Remove the two fixing bolts connecting the front sub frame and the body front point.

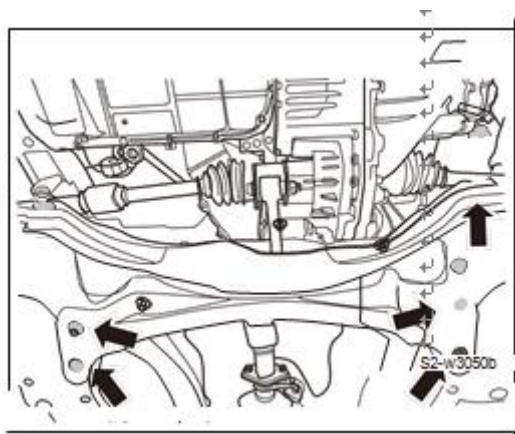
- 5) Remove the two fixing bolts connecting the front sub frame and the body middle point.

- 6) Remove the two fixing bolts connecting the front sub frame and the body rear point.

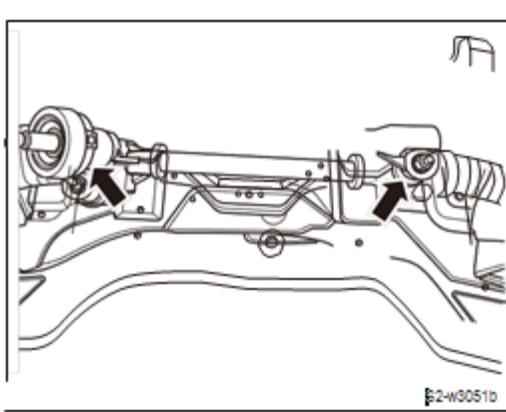
- 7) Remove the front sub frame with stabilizer bar and diverter assembly.

7. Remove the front sub frame

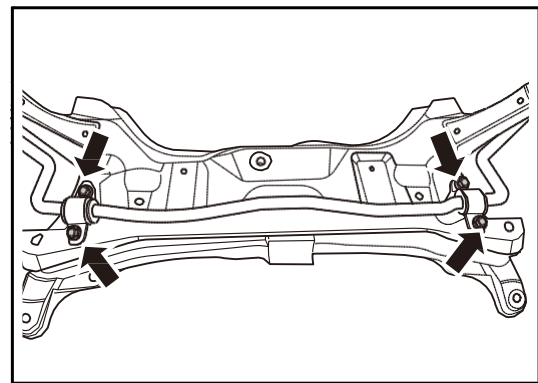
- 1). Remove the two hex flange bolts connecting diverter assembly and the front sub frame and two locking nuts on the diverter.



- 2) Remove the diverter assembly.



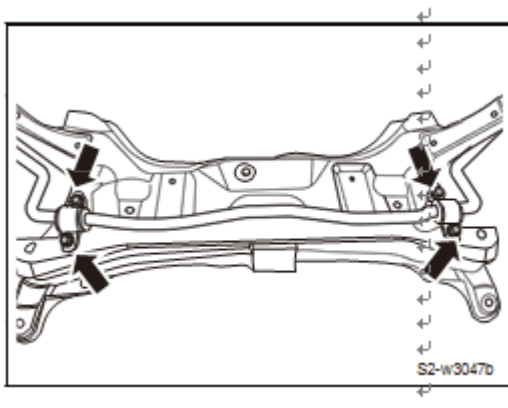
- 3). Disassemble four hex flange bolts pad connecting stabilizer bar and front sub frame.
- 4) Remove the stabilizer bar fixing bracket.
- 5) Remove the stabilizer bar liner.
- 6) Remove the stabilizer bar.



(II) Installation

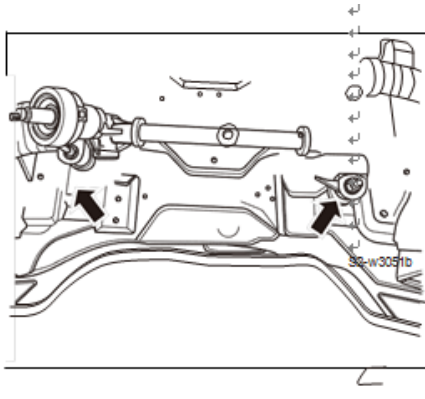
1. Install the front sub frame
 - 1) Place the stabilizer bar to the mounting position of the front sub frame.
 - 2) Place the stabilizer bar liners, stabilizer bar mounting bracket; tighten the four hex flange bolts pad connecting the stabilizer bar and front sub frame.

Tightening torque 60 ~ 72N • m



- 3) Place the diverter assembly to the front sub frame mounting position.
- 4) Install the two hex flange bolts connecting diverter assembly and the front sub frame and two locking nuts of diverter.

Tightening torque 95 ~ 105N • m



2. Install the front sub frame with stabilizer bar and diverter assembly

1) Place the front sub frame with stabilizer bar and diverter assembly to the mounting position.

2) Install two fixing bolts connecting the front sub frame and the body rear point.

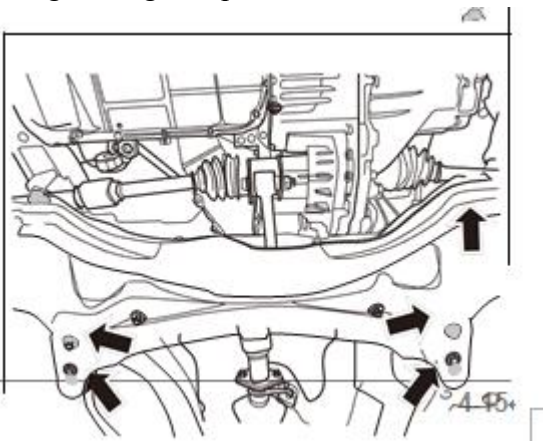
Tightening torque $60 \sim 80\text{N} \cdot \text{m}$

3) Install two fixing bolts connecting the front sub frame and the body middle point.

Tightening Torque $130 \sim 150\text{N} \cdot \text{m}$

4) Install two fixing bolts connecting the front sub frame and the body front point.

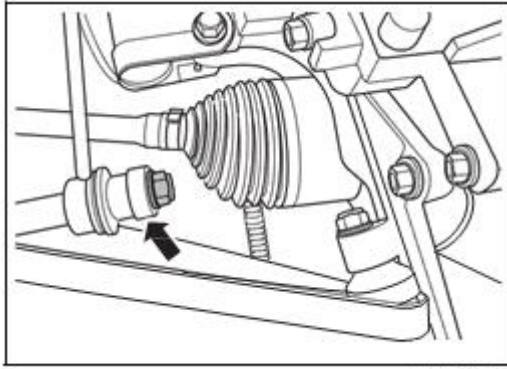
Tightening Torque $110 \sim 130\text{N} \cdot \text{m}$



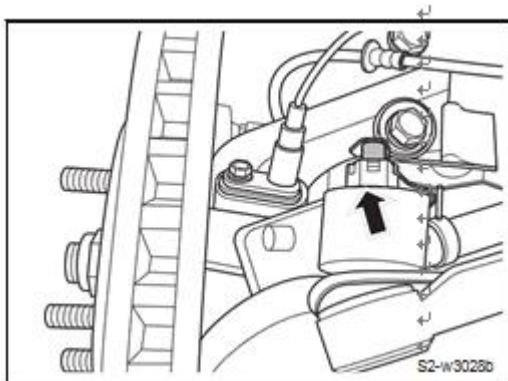
5) Install a self-locking nut connecting the left tie ball pin rod assembly and stabilizer bar.

Tightening torque $55 \sim 65\text{N} \cdot \text{m}$

Note that self-locking nuts cannot be reused and must be replaced for the new ones.

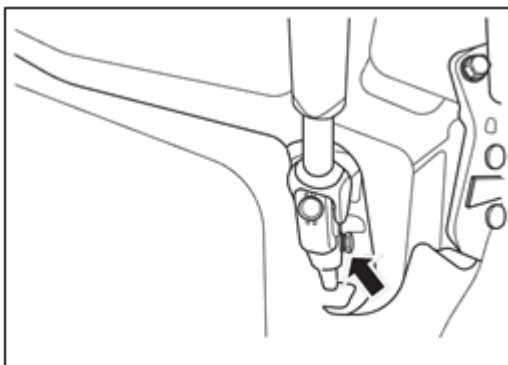


6) Remove a cotter and slotted nut connecting the knuckle and tie rod.



7) Install a mounting bolt connecting the steering shaft with a universal joint assembly and the diverter.

Tightening torque 30 ~ 35N • m

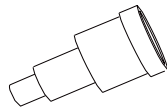


3. Install the rear suspension assembly
4. Install the left lower arm assembly
5. Install the right lower arm assembly
6. Install the right front wheel
7. Install the left front wheel

VIII. Front wheel hub assembly

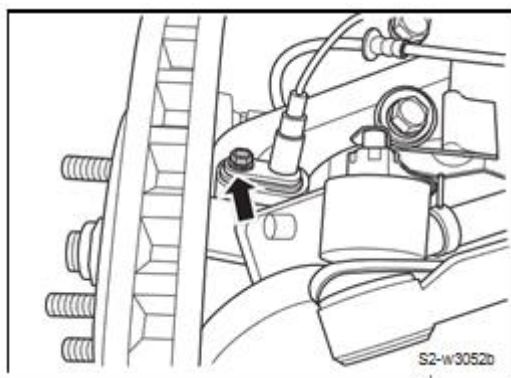
(I) Special tools

Hub Installation Tools

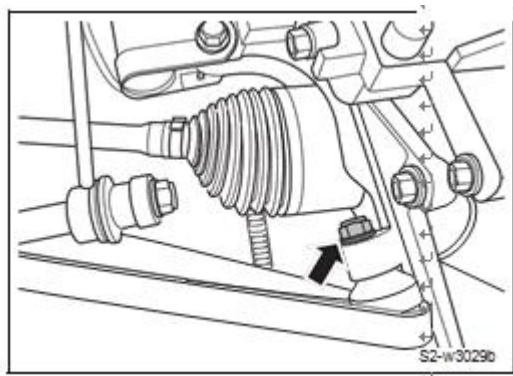
No.	Tool No.	Tool name	outlook
1		Hub Installation Tools	

(II) Remove

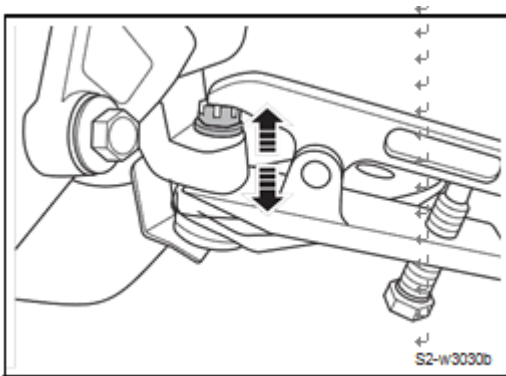
1. Open the engine hatch
2. Disconnect the negative battery cable
3. Remove the wheels refers to the wheels
4. Remove the front brake caliper assembly refers to the front caliper assembly
5. Remove the front brake disc refers to the front brake discs
6. Remove the front wheel hub assembly
 - 1). Remove a mounting bolt connecting the front wheel
ABS wheel speed sensor and front steering section.



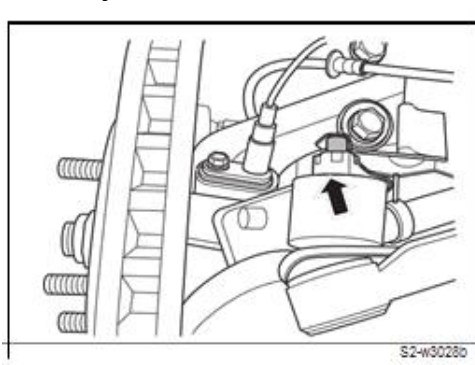
- 2) Remove the cotter pin and slotted nut connecting the lower arm assembly and knuckle.



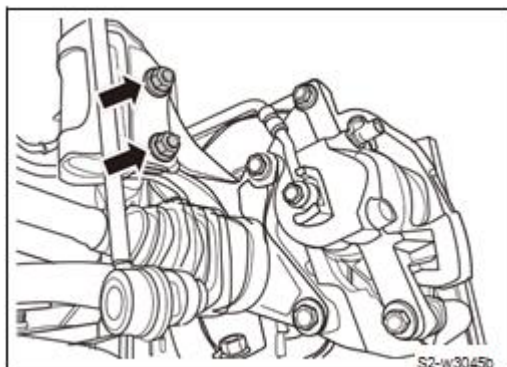
- 3) Disconnect the lower arm assembly and knuckle with a special tool.



4) Remove the cotter pin and slotted nut connecting the diverter assembly and knuckle, disengage the diverter assembly and knuckle connection.



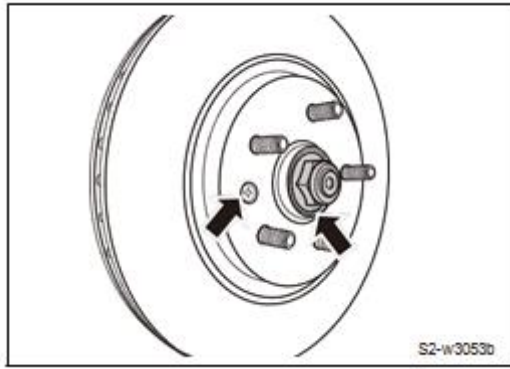
5) Remove the two bolts and nuts connecting the knuckle and front shock absorber assembly.



6) Remove self-locking nuts connecting the drive shaft and wheel hub assembly.

7) Disconnect the drive shaft and front hub assembly.

8) Remove the front wheel hub assembly.

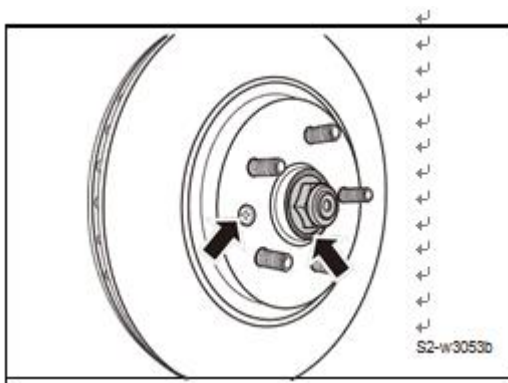


(III) Installation

1. Install the front wheel hub assembly

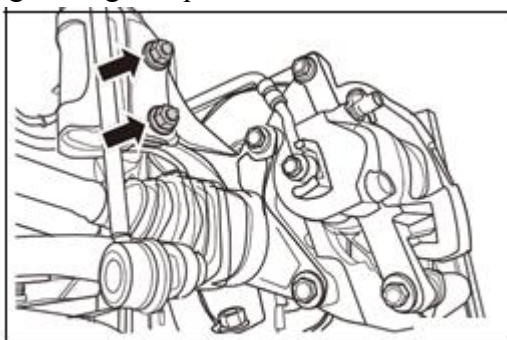
- 1) Install the self-locking nuts connecting the drive shaft and the front wheel hub assembly.

Tightening Torque 240 ~ 260N • m



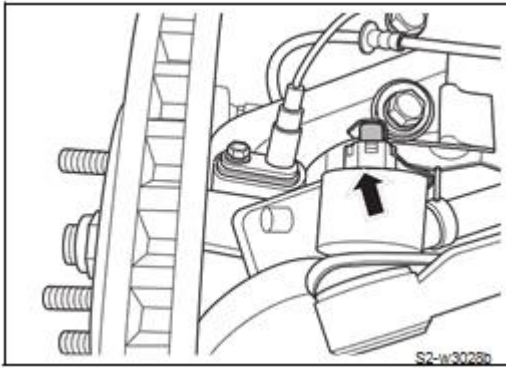
- 2) Install the two bolts and nuts connecting the knuckle and front shock absorber assembly.

Tightening Torque 100 ~ 120N • m



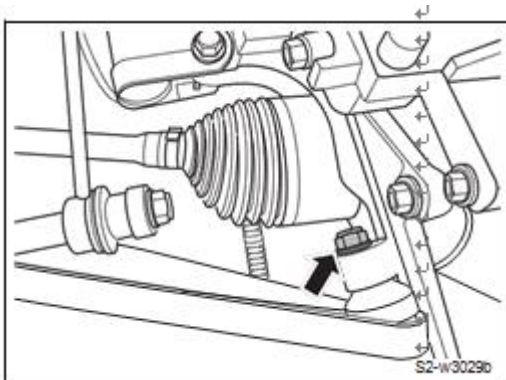
- 3). Install the cotter pin and slotted nut connecting the diverter assembly and the knuckle.

Tightening torque 50 ~ 55N • m



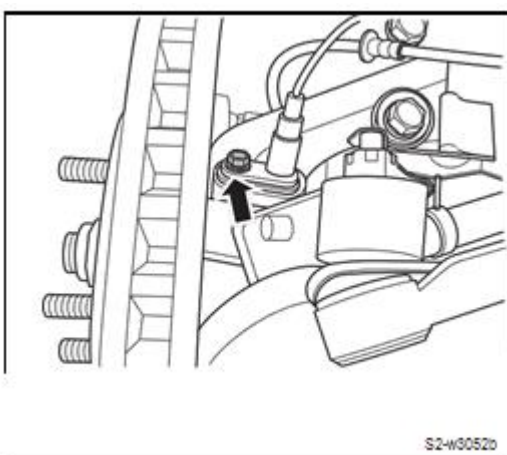
4) Install the cotter pin and slotted nut connecting the lower arm assembly and knuckle.

Tightening torque 60 ~ 72N • m



5) Install a mounting bolt connecting the front wheel ABS wheel speed sensor and the front diverter.

Tightening torque 10 ~ 15N • m



2. Install the front brake discs
3. Install the front brake caliper assembly
4. Install the wheel
5. Connect the negative battery cable
6. Close the engine hatch

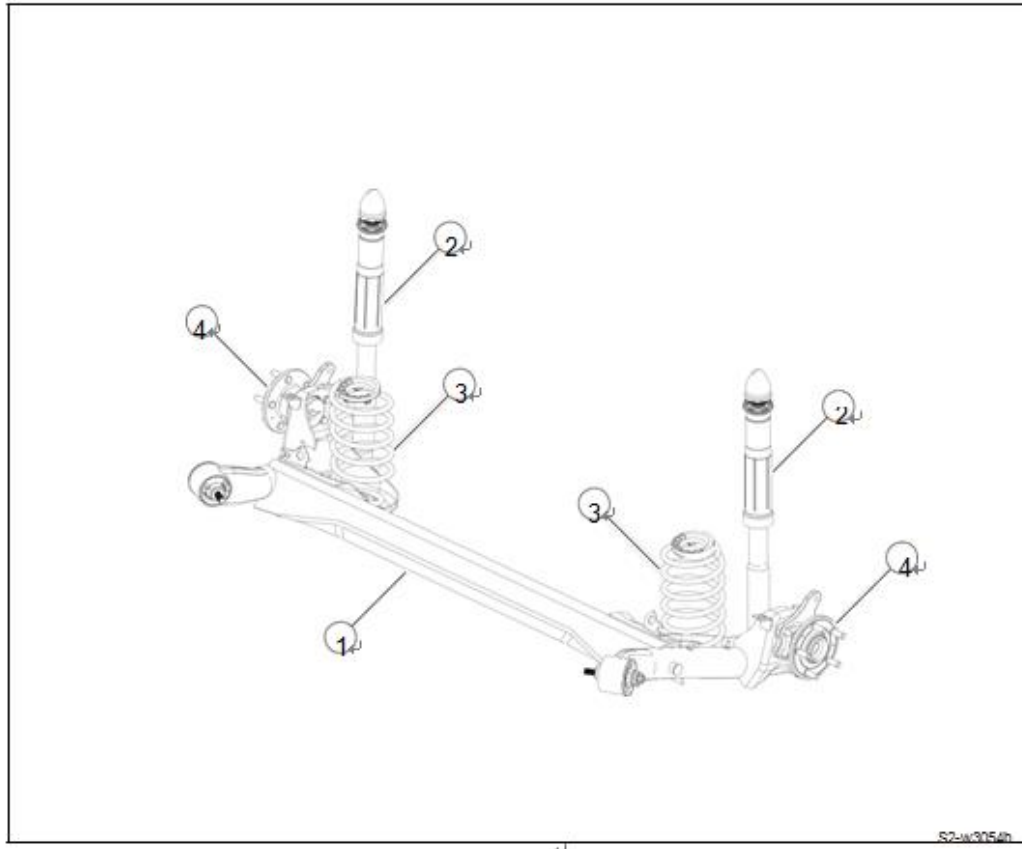
Rear Suspension

I. Overview

(I) Structure Summary

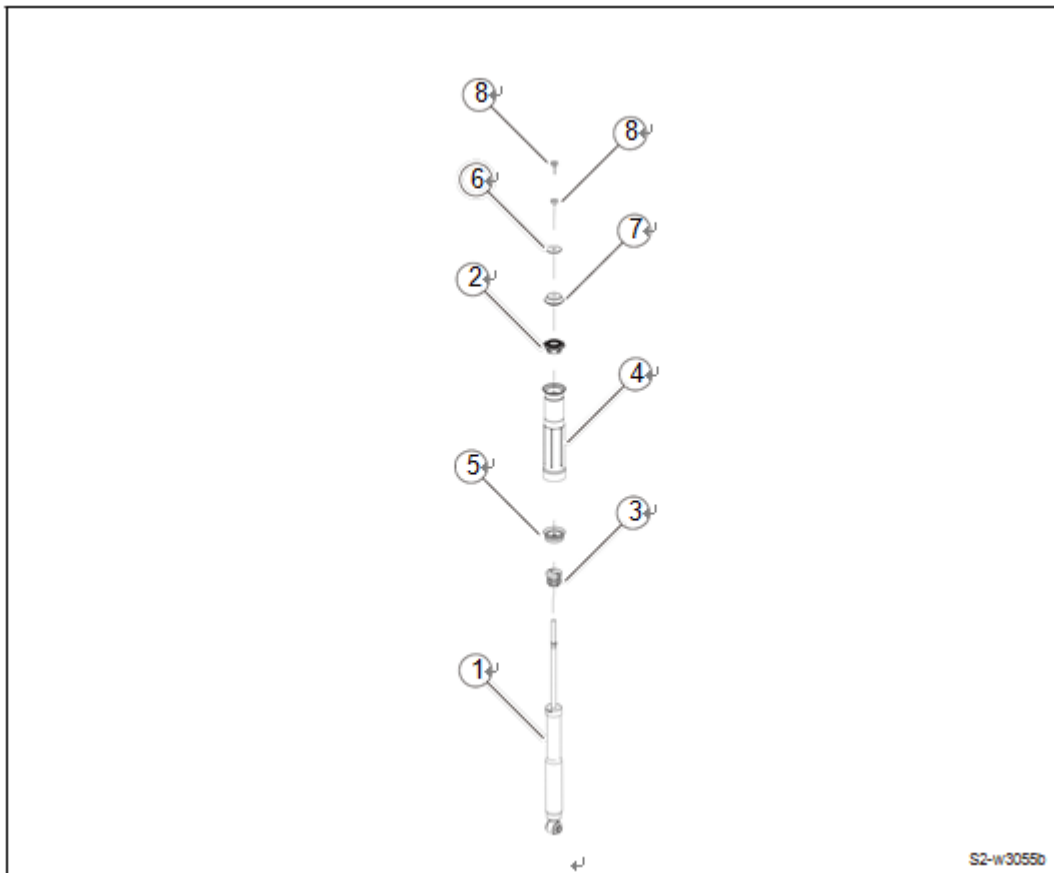
Rear suspension structure

1 2 3 4



1. Rear torsion beam assembly
2. Rear spool assembly
3. Rear coil spring
4. Rear wheel hub assembly

Rear shock absorber assembly structure



1. Rear shock absorber
2. Isolation pad B
3. Rear buffer block
4. Dust cover
5. Buffer block bearing
6. Isolation pressure pad
7. Isolation pad A
8. Nuts

(II) Technical parameters

Item		parameters and specifications
Rear suspension mode		Torsion beam form
Shock absorber	model	Bidirectional hydraulic cylinder
	stroke	160mm
	Damping force	Stretch $726\text{N} \pm 134\text{N}$ (0.3m/s)
		compression $434\text{N} \pm 96\text{N}$ (0.3m/s)
coil spring	model	Straight spiral spring
	Free height	352.5mm(reference)
	Color mark	Same color by both sides
Wheel Alignment	wheel total toe (rear)	$24' \pm 24'$
	single round beam	$12' \pm 12'$
	Wheel camber	$-56' \pm 30'$

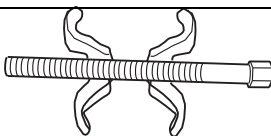
(III) Torque parameters

No	Item	Torque (N m)	remark
1	Rear shock absorber and body assembly connecting bolts	30~45	
2	Rear shock absorber and rear torsion beam connecting bolts	60~72	
3	Rear hub and torsion beam connecting bolts	60~72	
4	rear torsion beam and body connecting bolts	130~1	

(IV) Maintenance precaution

1. When install suspension or rubber liner, final tightening must be carried out under the condition that the tire is on ground and with no-load.
2. After finish suspension components maintenance, be sure to check wheel alignment.
3. The oil will shorten the life of the rubber liner. Be sure to clean the spilled oil.
4. The no-load condition is the condition that fuel, engine coolant and lubricant are normally raised, and spare tire, jack, hand tools and mats are in designated positions.
5. The locking nut should not be reused. Always use a new nut during installation. When replacing, before tighten the locking nut, do not wipe anti-rust oil on the locking nut.

(V) Special tools

NO	Tool	Outlook	Description
1	Shock absorber spring puller		Remove, install damper spring

II. Fault diagnosis
(I) Diagnostic table

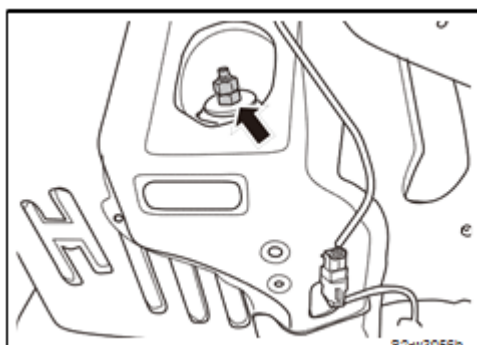
No.	Failure	Failure Analysis	Solution	Remark
1	Abnormal sound	assembly loose	fasten	
		wheel bearing fatigue or damaged	replace	
		Damper assembly damaged	Replace broken parts	
2	Vibration	Tire over pressure	Adjust pressure	
		Damper assembly damaged	Replace broken parts	
		wheel nuts loose	fasten	
		coil spring became shorter or broken	replace	
		tire defective	replace	
3	Body tilt	coil spring became shorter or broken	replace	

III. Rear shock absorber assembly

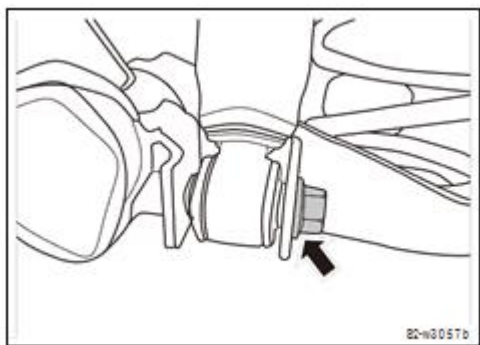
(I) Remove

1. Remove the rear wheels refers to wheels
2. Remove the rear seat cushion assembly refers to rear seat cushion assembly
3. Remove the rear seatback assembly refers to rear seatback assembly
4. Remove the rear door entry guard assembly refers to rear door entry guard assembly
5. Remove the C-pillar lower trim panel assembly refers to C-pillar lower trim panel assembly
6. Remove the C pillar upper trim panel assembly refers to C pillar upper trim panel assembly
7. Remove the tailgate entry guard assembly refers to tailgate entry guard assembly
8. Remove the tailgate trim panel assembly refers to tailgate trims panel assembly
9. Remove shock absorber assembly

- 1) Disassemble two nuts connecting the rear damper assembly and body.



- 2) Disassemble fixing bolt connecting damper assembly and rear torsion beam.



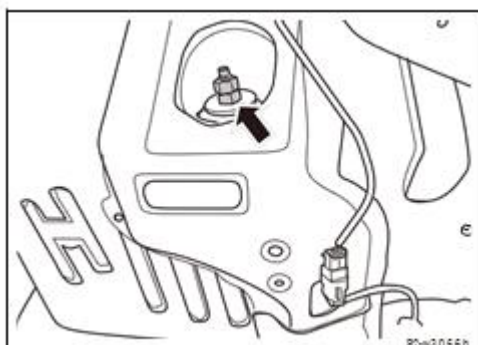
3) Remove the rear shock absorber assembly.

(II) Installation

1. Install the rear shock absorber assembly

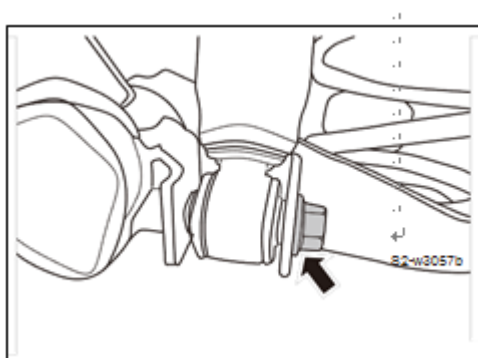
1) Install two nuts connecting the rear damper assembly and body.

Tightening torque 30 ~ 45N • m



2) Install fixing bolt connecting damper assembly and rear torsion beam.

Tightening torque 60 ~ 72N • m



2. Install the rear door trim panel assembly
3. Install the tailgate entry guard assembly
4. Install the C pillar upper trim panel assembly
5. Install the C-pillar lower trim panel assembly
6. Install the rear door entry guard assembly
7. Install the rear seatback assembly
8. Install the rear seat cushion assembly
9. Install the rear wheels

IV. Rear coil spring

(I) Remove

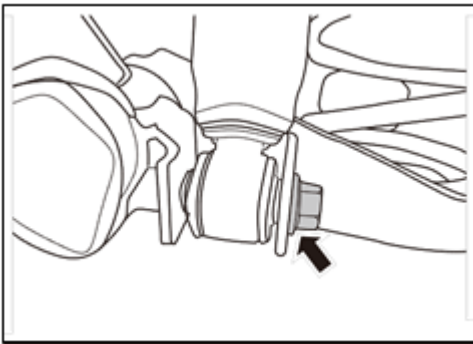
1. Remove the rear wheels refers to wheels
2. Remove the rear coil springs

△ Note Mark before removing.

- 1). Remove a fixing bolt connecting the left side damper assembly and torsion beam assembly.

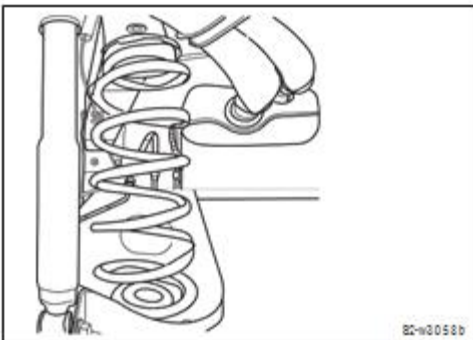
△ Note during demolition process, pay attention to spring sudden off to avoid personal injury!

- 2) Remove a mounting bolt connecting the right side damper assembly and the torsion beam assembly.



82-w3057b

- 3) Disassemble rear sprung rubber cushion, rear coil springs, rear unsprung rubber cushion.



82-w3058b

(II) Check

1. Check rear spring upper rubber cushion, and lower rubber cushion
 - 1). Check whether there is wear or damage to the rear spring upper rubber cushion, and lower rubber cushion. If so, replace it.
2. Check the coil spring
 - 1) Check whether there is wear or damage to the coil spring. If so, replace it

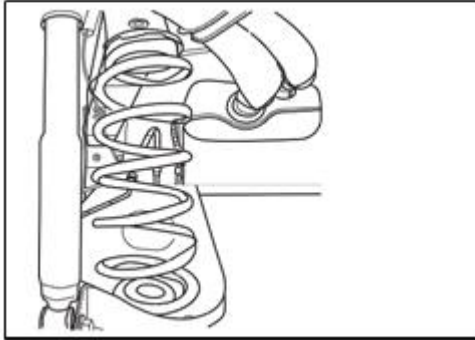
(III) Installation

1. Install the rear coil spring
 - 1) In accordance with the installation marks to install rear upper rubber cushion, rear coil springs, rear lower rubber

cushion.

△ Note When install rear spring upper rubber cushion, make the springs and rear spring upper rubber cushion fit.

△ Note put the lower end of the coil spring open toward back then install.

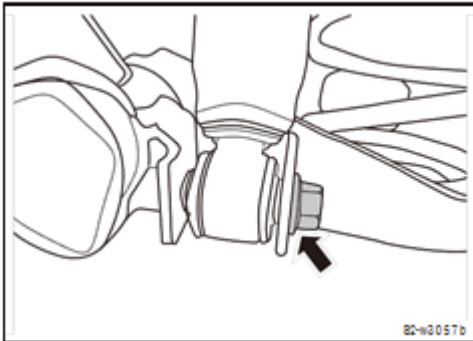


82-w3058b

2) Install a fixing bolt connecting the left side of damper assembly and the torsion beam assembly.

3) Install a fixing bolt connecting the right side of damper assembly and the torsion beam assembly.

Tightening torque 60 ~ 72N • m



82-w3057b

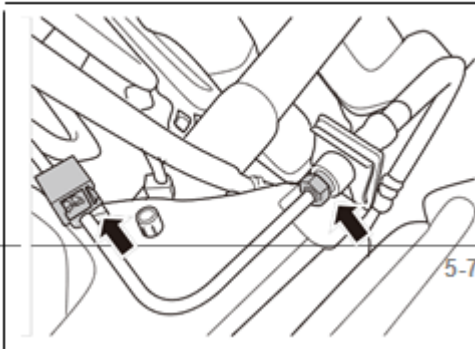
2. Install the rear wheels.

V. Rear torsion beam assembly

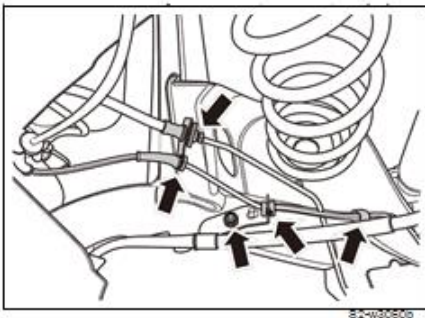
(I) Remove

1. Open the engine hatch
2. Disconnect the negative battery cable
3. Drain the brake fluid refers to brake fluid
4. Remove the left rear wheel refers to the wheel
5. Remove the right rear wheels refers to the wheel
6. Remove the left rear brake caliper assembly refers to the rear caliper assembly
7. Remove the right rear brake caliper assembly refers to the rear caliper assembly
8. Remove the left rear brake pipe assembly, the right rear brake pipe assembly refers to brake hose assemblies
9. Remove the torsion beam assembly
 - 1). Lower the parking brake.

2) Disassemble the card and nuts connecting the torsion beam assembly and rear brake discharge pipe assembly.

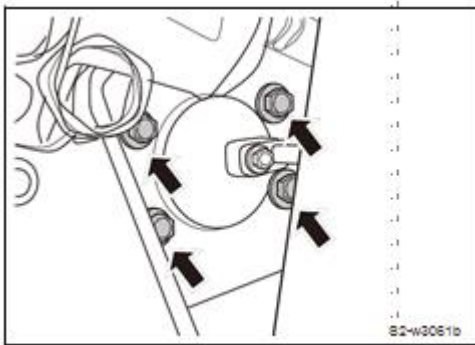


3) Remove the connecting of parking brake beam assembly drawing and the rear wheel ABS wheel speed sensor assembly and torsion beam assembly.



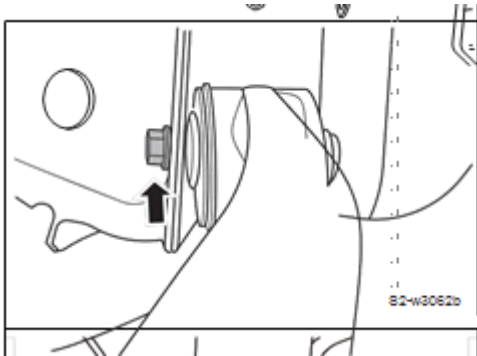
4) Remove the four fixing bolts connecting the torsion beam assembly and the left rear wheel hub assembly.

5) Remove the four fixing bolts connecting the torsion beam assembly and the right rear wheel hub assembly.



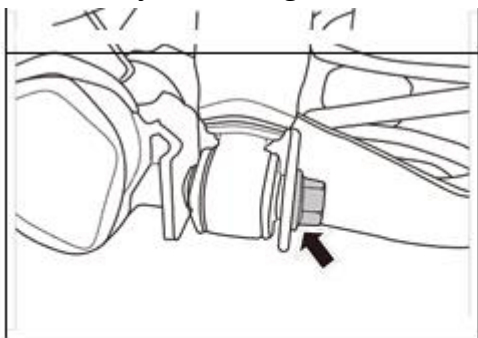
6). Remove a fixing bolt connecting torsion beam assembly and the left side of body.

7) Remove a fixing bolt connecting torsion beam assembly and the right side of body.



8). Remove a fixing bolt connecting torsion beam assembly and the left rear shock absorber.

9). Remove a fixing bolt connecting torsion beam assembly and the right rear shock absorber.



10) Remove the torsion beam assembly

(II) Installation

1. Install torsion beam assembly

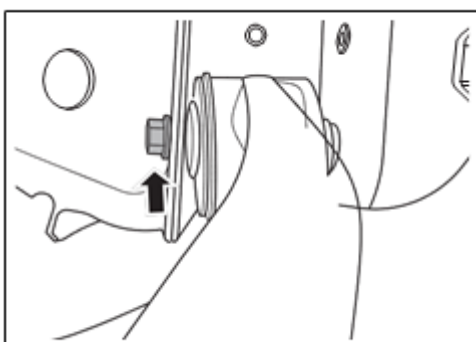
1) Place the torsion beam assembly to the mounting position.

2) Install a fixing bolt connecting torsion beam assembly and the left side of body.

Tightening Torque 130 ~ 150N • m

3) Install a fixing bolt connecting torsion beam assembly and the right side of body.

Tightening Torque 130 ~ 150N •

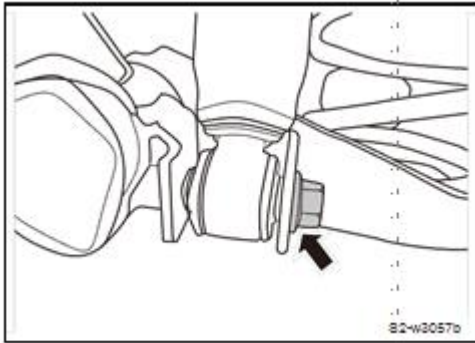


- 4) Install a fixing bolt connecting torsion beam assembly and the left rear shock absorber.

Tightening torque 60 ~ 72N • m

- 5) Install a fixing bolt connecting torsion beam assembly and the right rear shock absorber.

Tightening torque 60 ~ 72N • m

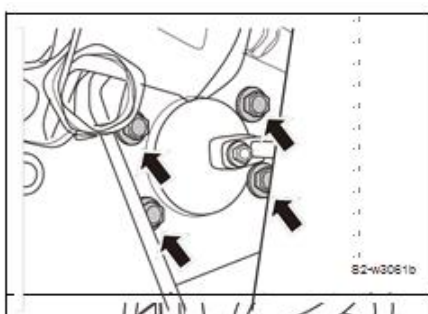


- 6) Connect the four fixing bolts connecting the torsion beam assembly and the left rear wheel hub assembly.

Tightening torque 60 ~ 72N • m

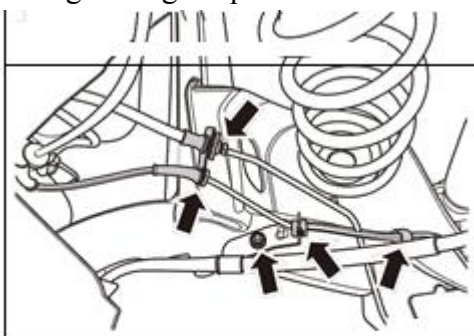
- 7) Connect the four fixing bolts connecting the torsion beam assembly and the right rear wheel hub assembly.

Tightening torque 60 ~ 72N • m

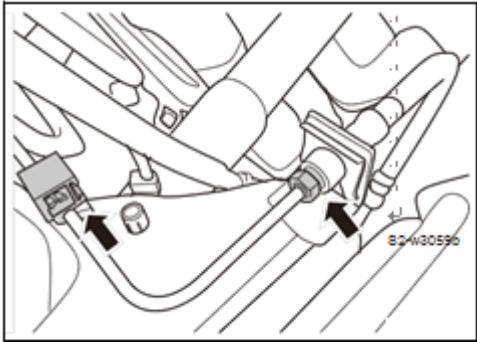


- 8) Install the two fixing bolt and two brackets connecting the parking brake beam assembly drawing and the rear wheel ABS wheel speed sensor and torsion beam assembly.

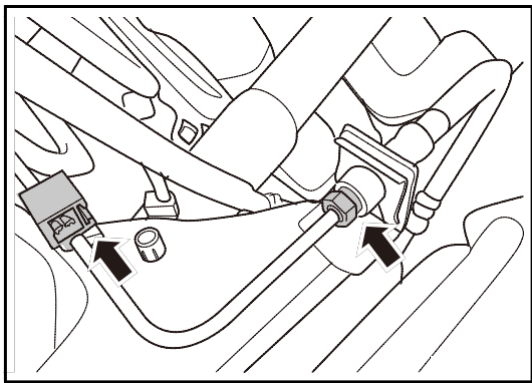
Tightening torque 7 ~ 11N • m



- 9). Install the fixing point connecting the rear brake discharge pipe assembly and the torsion beam assembly.
- 2. Install the left rear brake pipe assembly, the right rear brake pipe assembly.

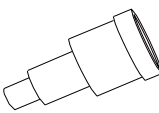


- 3. Install the left rear caliper assembly
- 4. Install the right rear brake caliper assembly
- 5. Install the right rear wheel
- 6. Install the left rear wheel
- 7. Fill the brake fluid refers to brake fluid
- 8. Drain brake System refers to brake system
- 9. Connect the negative battery cable
- 10. Close the engine hatch



VI. Rear wheel hub assembly

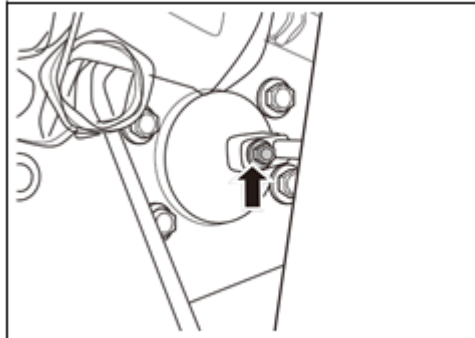
(I) Special tools

No	Tool No	Tool name	Outlook
1		Hub Installation Tools	

(II) Remove

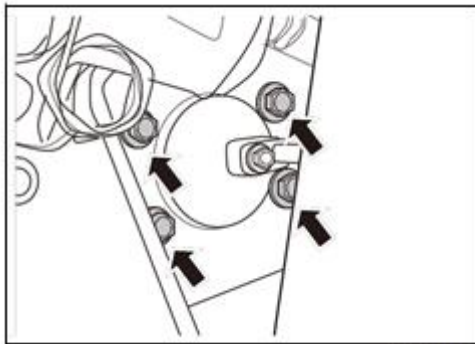
- 1. Remove the wheels refers to the wheels
- 2. Drain the brake fluid refers to the brake fluid.
- 3. Remove the rear brake caliper assembly refers to the rear brake caliper assembly

4. Remove the brake disc assembly refers to the rear brake discs
5. Remove the rear wheel hub assembly
 - 1). Remove a fixing bolt connecting the rear ABS wheel speed sensor and rear hub assembly.
 - 2). Disengage the connection between the rear ABS wheel speed sensor and the rear wheel hub assembly.



82-430630

- 3) Remove four fixing bolts connecting the rear torsion beam assembly and hub assembly.



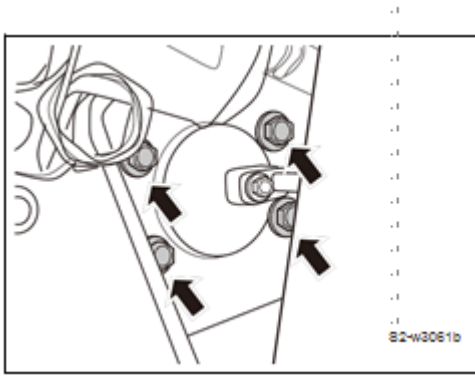
82-430630

- 4) Remove the rear wheel hub assembly.

(III) Installation

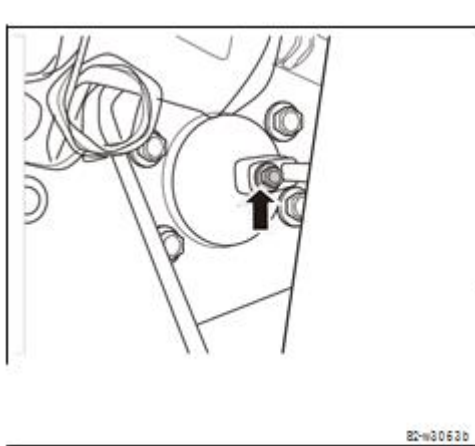
1. Install the rear wheel hub assembly
 - 1). Successively connects the rear brake disc, rear brake fender, and the rear wheel hub assembly to the torsion beam.
 - 2) Install four mounting bolts from inside the torsion beam assembly connecting the rear hub assembly and the torsion beam.

Tightening torque 60 ~ 72N • m



3) Install a fixing bolt connecting the rear ABS wheel speed sensor and rear hub assembly.

Tightening torque 8 ~ 10N • m



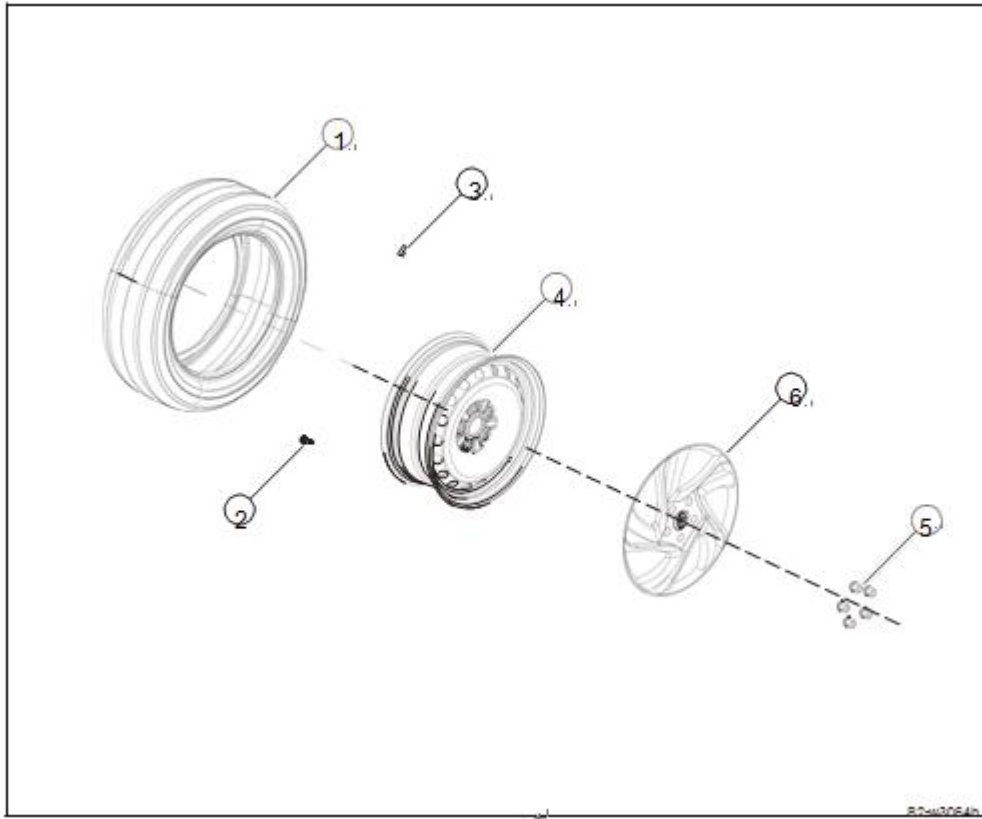
2. Install the rear brake disc assembly
3. Install the rear brake caliper assembly
4. Fill the brake fluid refers to brake fluid
5. Drain the brake system refers to brake system
6. Install the rear wheel

Wheel and Tire

I Overview

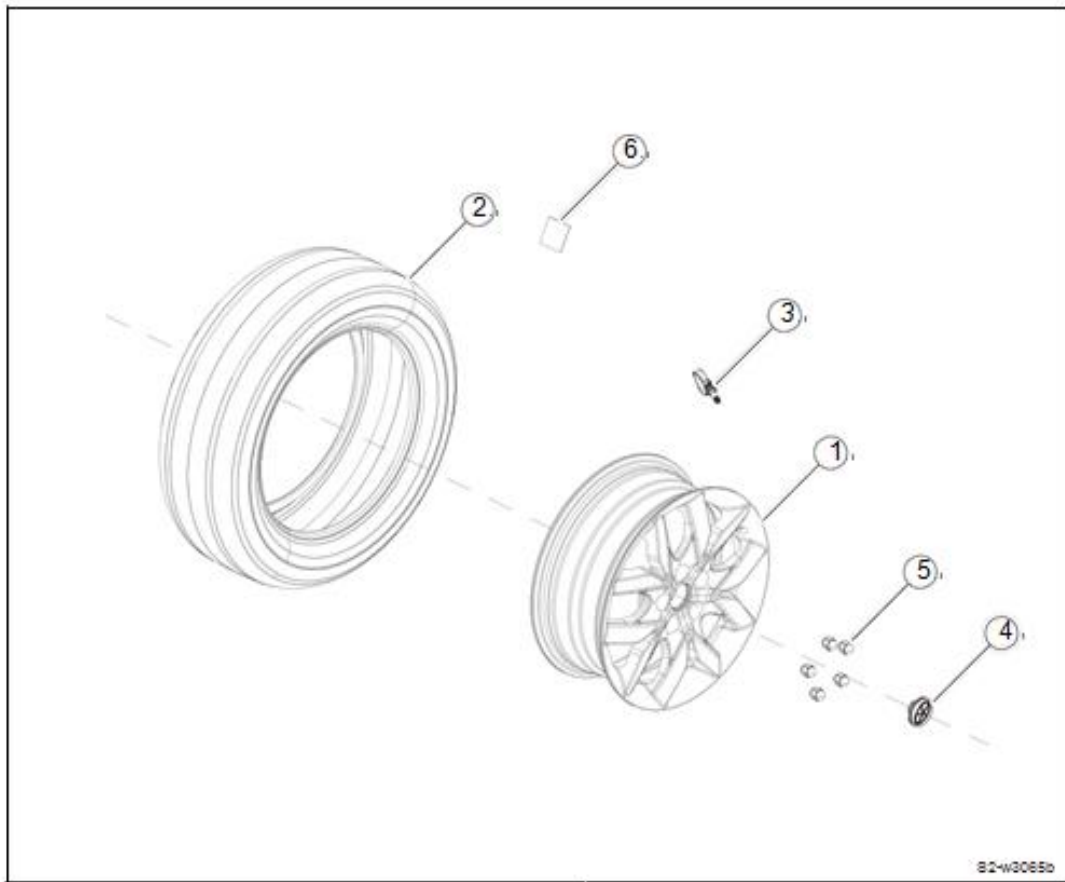
(I) Structure summary

Tire structure (steel)



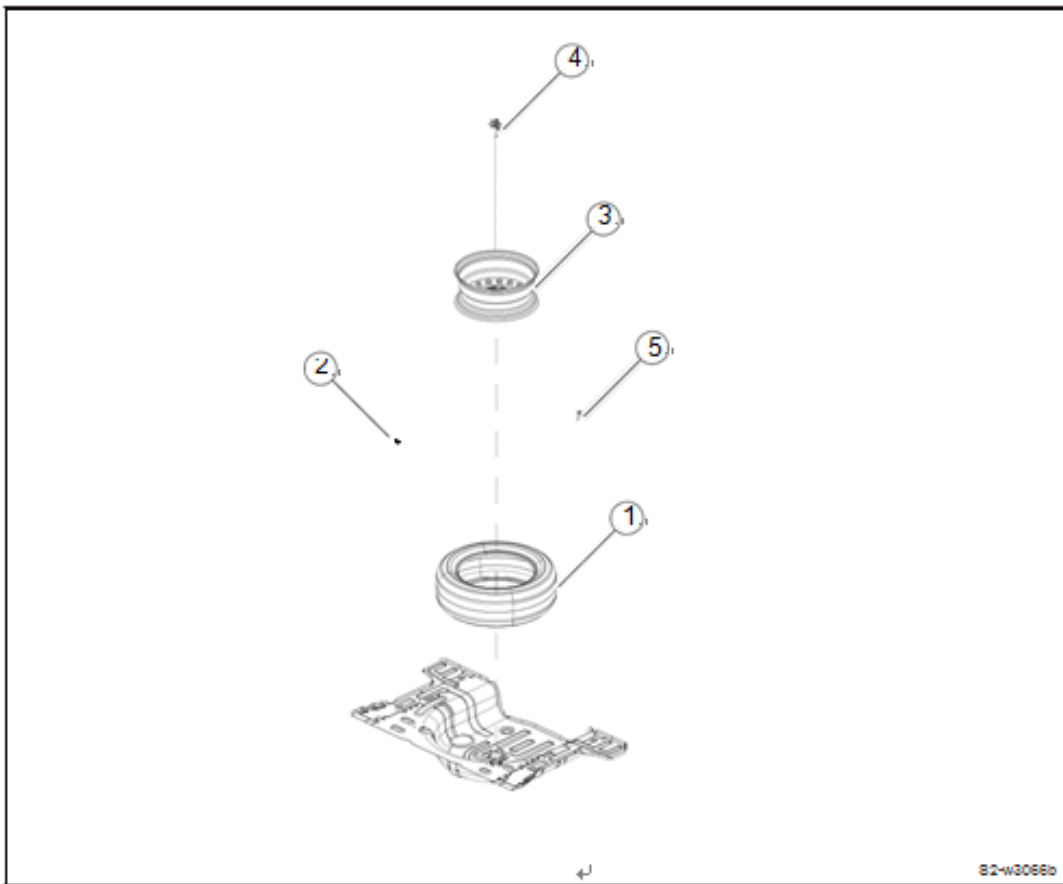
1. Tire (205/55 R16)
2. TR414 valve
3. Balancing Pad
4. Steel rim (6.5Jx16)
5. Tire nut
6. The wheel cap

Tire structure (aluminum wheels)



1. Aluminum rims (6.5Jx16)
2. The tire (205 / 55R16)
3. The tire pressure sensors
4. The decorative cover assembly
5. Wheel Nut
6. The tire pressure label

Spare tire structure



1. Tires
2. The balance weight
3. Rim
4. The spare tire fixing stud assembly
5. Valve

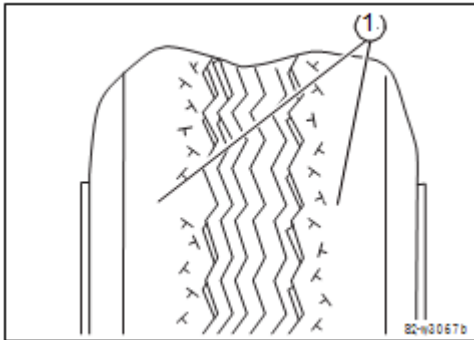
Tire pressure

Tire pressure has a decisive influence on the aspects of tire wear, fuel consumption, fault damage, therefore, in order to drive safely, maintain standard pressure and check the tire pressure regularly.

The load capacity of the tire is corresponding to inflation pressure; determine a reasonable tire pressure according to the condition of the vehicle load capacity. Climate and season changes should not be a reason to adjust the tire pressure.

Incorrect tire pressure can cause:

- 1) Tires with no enough pressure will cause tire shoulder quicker wear, tire deflection, rolling resistance increasing



- 2). Excessive tire pressure causes rapid wear of the middle part of the tire tread, and reduce tire buffer capacity.

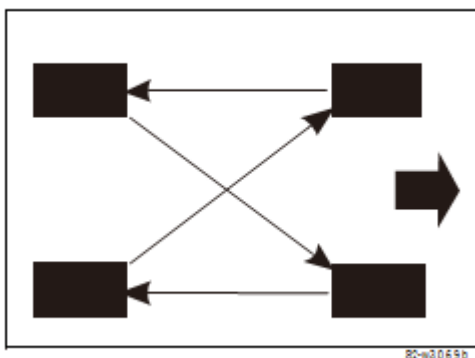
Tire transposition

When running the wear situation of the front and rear wheels of the vehicle will be very different according to the different load capacity, so in order to avoid tire wear by a single direction, regular and timely transposition to make tires wear evenly, thereby extending the life of the tire.

NOTE: tire should be transposed when reach 8000km.

Tires should be transposed if new tires are replaced.

- 1) The recommended tire transposition



Wheel replacement

1. The wheel should be replaced when reaches 50000km in normal driving.
2. If one of the following occurs, it needs to be replaced:
 - 1).The tire tread has worn at least three markers.
 - 2) Tire rubber cords or cords appear.

- 3) The tire tread or tire shoulder crack and cords occur.
- 4) Tire bump, bulge or delamination.
- 5) Tire punctured, scratched or otherwise damaged, its extent is difficult to repair.

Wheel alignment

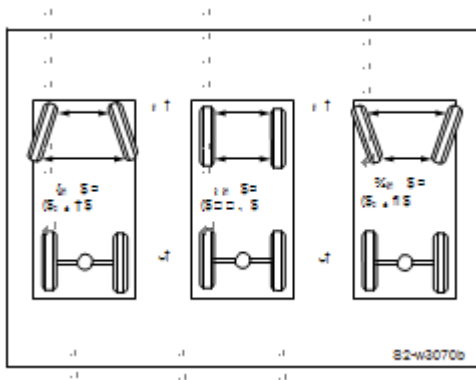
Correct wheel alignment plays an important role for stable good control of the vehicle, eliminating the abnormal tire wear, reducing driver fatigue.

Wheel alignment parameters include:

1. Toe

Toe is the difference between the distance of the two front wheels and the distance of the same wheels two rear ends. If the wheels are perfectly parallel and the toe is zero. If the front wheel inwardly inclined to car center line, the toe angle is positive. Otherwise the toe is negative.

The function of the toe is compensating the inward or outward rolling tendency caused by camber angle of the tire and the road surface resistance.

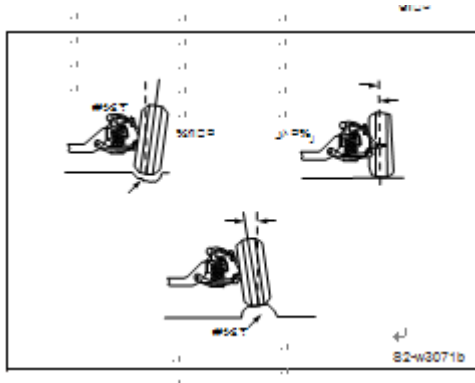


2. Camber

Camber is tire relative angle to the vertical reference line, when the top of a wheel tilts outward, portion is defined as positive, otherwise defined as negative. Camber settings can affect the control of the vehicle direction and tire wear.

Improper camber settings can cause excessive tire wear or uneven wear, too much positive camber will cause the outer tire tread wear, when the load of the outside tread is higher than the inner side, it will cause uneven wear.

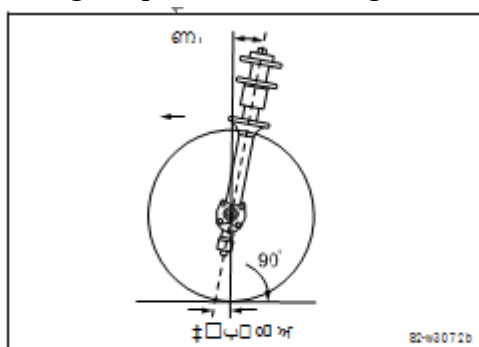
Excessive negative camber will cause the inside of the tire tread wear, the load of the inside tread is higher than the outside, it will cause uneven wear.



3. Caster

Caster angle is the vertical angle between the kingpin axis and the ground. Kingpin caster angle

can produce a stability straight line running: The vehicle has a positive kingpin caster angle, while rotating the wheel to the left, the left wheel will turn left around the kingpin, as the kingpin axis tilt backward, the wheel ground movement trend downward in the vertical direction, so that it actual lift up the left vehicle body. When turning is completed, after the release of the steering wheel, and force the tire rise upwards and return to the relative original height of the body, so that the journal back to the original position of driving towards the front.



(II) Maintenance parameters

Item			Parameters
Tire pressure (cold)			220±10KPa
Tire size(1.5VVT + 5MT 1.5VVT + CVT)			205/55 R16 94V
Tire size (1.5VVT + 5MT)			205/55 R16 94V
Wheel run out	Radial	steel wheels	1.0mm
		Aluminum wheels	0.3mm
	Axial	steel wheels	1.0mm
		aluminum wheels	0.3mm

Item			Parameters
Wheel alignment parameters	Front wheel	Front wheel toe	3.75'±6.75'
		Front wheel camber	24'±30'
		Kingpin Inclination	10.5 °±1 °
		Kingpin caster angle	3.65 °±0.75 °
		Kingpin offset	mm
	Rear wheel	The total rear wheel toe angle	24'±24'
		Unilateral rear wheel toe	12'±12'
		Rear wheel camber angle	-56'±30 '

(III) Torque parameters

No	Item	Torque (N • m)	Remarks
1	wheel nut	90~110	
2	rod length adjustment lock nut	45~55	
3	spare wheel fixing stud	25~35	

(IV) Maintenance Precaution

1. Please use the original wheels.
2. During the new tire run-in period emergency start, sharp turns, sudden braking and using in bad condition should be avoided to prevent new tires premature failure.
3. The new tire should be carried out wheel balance before using.

II. Fault diagnosis

(I) Fault diagnosis table

No.	Failure	Failure Analysis	Solution	Remark
1	steering wheel circumference vibration	the tire and rim excessive deflection	replace	
		Wheel nut loose	fasten	
		Wheel unbalance	replace	
		Tire unevenly tear	Adjust or replace	
		Tire insufficient pressure	replace	
		Front wheel bearing damaged or worn	Adjust or replace	
		steering system failure	Adjust or replace 换	
		suspension system	Adjust or replace 换	
2	tire premature wear	tire pressure incorrect	Adjust	
		Wheel alignment bad	Adjust toe and replace	
			Replace the rear tire torsion beam	
3	Tire noise	tire pressure incorrect	Adjust	
		tire deteriorate	replace	

No.	Failure	Failure Analysis	Solution	Remark
4	Road noise or body vibration	insufficient tire pressure	Adjust	
		Unbalanced wheel	Adjust	
		Deformed rim or tire	Maintain or replace	
		Tire unevenly wear	Adjust or replace	
5	Steering wheel motive up and down	Tire and rim excessive wear	replace	
		Wheel nut loose	Fasten	
		Unbalanced wheel	Adjust	
		engine mounting rubber cracked or worn	replace	
		gearbox mounting rubber cracked or worn	replace	
6	steering wheel tilt unilateral	Tire pressure on each side is uneven	Adjust	

		Braking system failure	Adjust or replace	
		Tire pressure incorrect	Adjust	
		Excessive tire wear or	Adjust or replace	
		steering system failure	Adjust or replace	
		Braking system failure	Adjust or replace	
		suspension system failure	Adjust or replace	
7	Unstable running	Tire pressure on each side	Adjust	
		Rim or tire deformation	maintain or replace	
		wheel nuts loose	Fasten	
		steering system failure	Adjust or replace	
		suspension system failure	Adjust or replace	
8	Steering wheel heavy	insufficient tire pressure	Adjust	
		steering system failure	Adjust or replace	
		suspension system failure	Adjust or replace	
9	steering wheel return bad	insufficient tire pressure	Adjust	
		steering system failure	Adjust or replace	
		suspension system failure	Adjust or replace	

III Wheel alignment

(I) Wheel alignment check and adjustment

1. Check the wheel alignment parameters

1) Check wheel alignment parameters to see whether it meets the requirements, if not the front toe should be adjusted in time, if other parameters not match, find the cause and replace the parts.

Front toe angle parameters are as follows:

Front toe angle $3.75' \pm 6.75'$

△ Note the position inspection must carried out on flat ground under no-load conditions

△ Note the front wheel camber, caster, kingpin inclination angle and the rear wheel toe-in, rear wheel camber of this model are pre-programmed at the factory, do not adjust.

△ Note If camber, caster and kingpin inclination is not within the standard range, check the front suspension, steering knuckle, shock absorber and tie rod for wear or damage. If there is the above mentioned condition, replace suspect parts.

Front wheel camber, kingpin caster angle, kingpin inclination angle and the rear wheel toe-in, rear wheel

camber parameters are as follows:

Front wheel camber: $24' \pm 30'$ Kingpin caster angle: $3.65^{\circ} \pm 0.75^{\circ}$ Kingpin Inclination: $10.5^{\circ} \pm 1^{\circ}$ total rear wheel toe angle: $24' \pm 24'$ rear wheel unilateral toe: $12' \pm 12'$ rear wheel camber angle: $-56' \pm 30'$

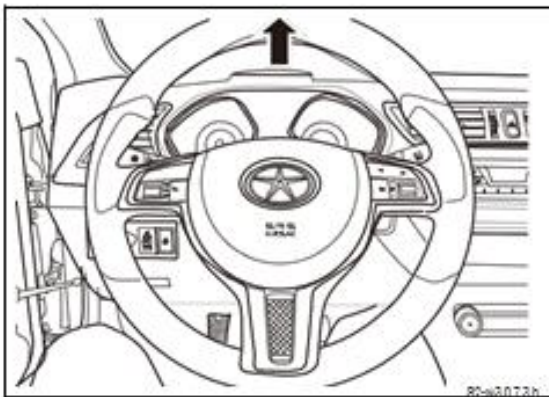
2. Adjust the front wheel toe

△ Note the position inspection must be carried out on flat ground under no-load conditions

Front toe angle $3.75' \pm 6.75'$

If the toe is not within the standard range, adjust as follows:

- 1) Check the set toe value on the wheel alignment meter.
- 2). Straighten steering wheel and lock dead.

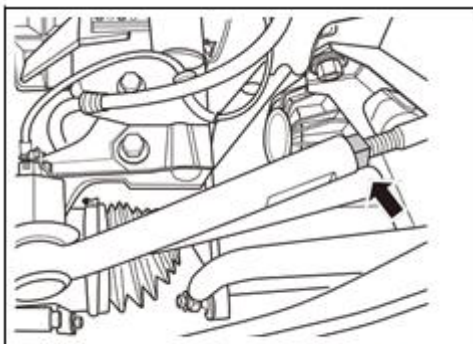


- 3) Loosen the tie rod end locking nuts.
- 4) Turn clockwise or counter clockwise around the tie rod beam, adjust the toe value to the standard value.

△ Note the turning amount of the tie rod should be considerable

- 5) Locking the tie rod end locking nuts.

Tightening torque $45 \sim 55\text{N} \cdot \text{m}$

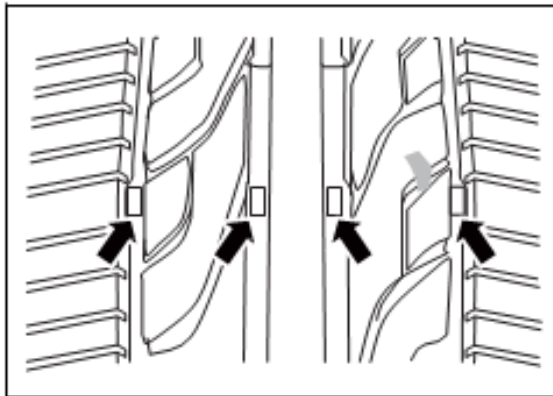


IV Wheels

(I) Vehicle inspection

1. Check tire appearance
 - 1). Make sure whether there is wheel wear, inflatable improper, cracks or other damage.
2. Check the tire pressure.
 - 1) Use a well performed tire gauge to check tire pressure, if not within the standard value, inflate or deflate the tire.
Standard value: $220 \pm 10\text{KPa}$
3. Check the tire treads
 - 1) Check the depth of the tire treads
Tire size: 205/55 R16 (1.5VVT + 5MT) tire size: 205/55 R16 94V (1.5VVT + 5MT /1.5VVT + CVT)

 Δ Note when the depth of the tire tread reaches the limit or less, tire tread has wear indicator. When there is an indicator, replace the tires.

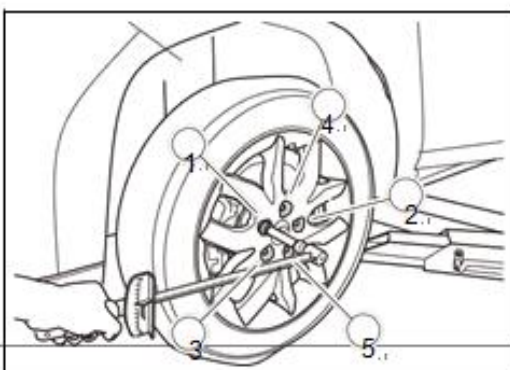


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- 2) Check the tire treads to see whether there are foreign objects. If yes, please remove.

(II) Remove

1. Remove the wheel
 - 1) Loosen 5 wheel nuts on the wheel.
 - 2). Lifting.
 - 3) Remove 5 wheel nuts on the wheel.
 - 4) Remove the wheel



(III) Installation**1. Install the wheel**

- 1). According to the sequent ①-②-③-④-⑤ showed in the pig to install the wheel nuts, tighten slightly.
- 2). Lower the vehicle.
- 3) According to the sequent ①-②-③-④-⑤ showed in the pig to tighten wheel nuts.

Tightening torque 90 ~ 110N • m

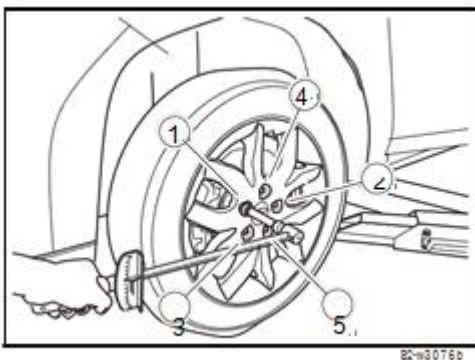
△ Note 1. If manual installation, preload, then evenly

tightening according to the sequence as ① - ② - ③ - ④-

⑤.

2. If the automatic tightening, tightening torque should be adjusted, tightened once.

3. Strictly tighten all wheel nuts according to fig showed sequence

**V Wheel balance****(I) Remove**

1. Remove the wheels needed to be adjusted refers to the tire wheel
2. Remove the old balance weight on both side of the wheels, and remove foreign objects on the tire treads

△ Note 1. When removing, be careful not to scratch the wheels.

2. If the tire is new, remove the tape.

(II) Adjustment**1. Adjust the wheel balance**

- 1). Use the center hole as the guide; mount the wheel on the balancing machine and start the wheel balancing machine.
- 2). When the value of internal and external imbalances on both sides of the wheel have emerged on the balancing machine monitor, select a balancing pad which weight

close to the equilibrium value and assembly specified in the balancer wheel on the outside of the corresponding position.

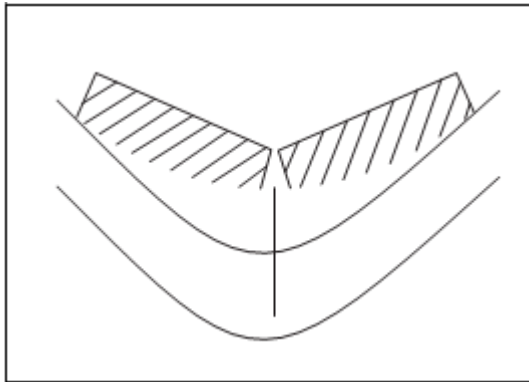
△ Note Install the outer balance weight before install the inside ones. Before installing the balance weight, be sure to clean the wheel surface.

△ Note 1. The balance weight cannot be reused, get a new one every time.

2. Installed the balance weight pads cannot be more than three.

3. Always use original pads.

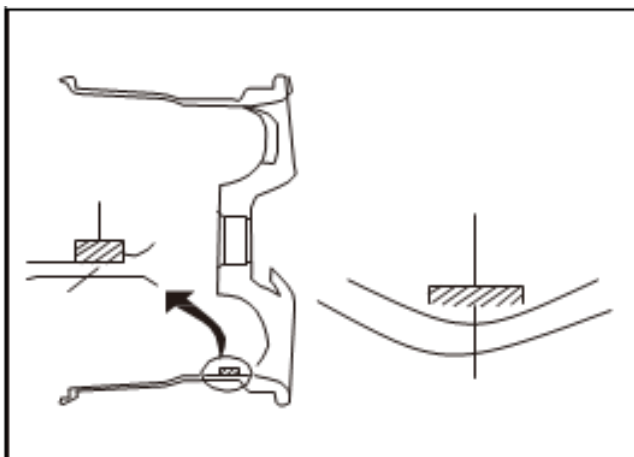
4. Do not place weight pad on another piece.



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3) Start the wheel balancer again.

4) In accordance with the position (or angle) of the wheel balancer indication, knock balance pads into the inside of the wheel.



5) Start balancing machine, confirm the remaining inside and outside imbalance value is less than 5g, if either side residual unbalance value is bigger than 5g, please continue to the above work,

△ Note balance pad should be used according to the

demand, the using standard refers to service technical parameters form.

VI. Wheel run out

(I) Check wheel run out

1. Remove tire wheel which needed to be checked refers to the wheels.
2. Install the wheel on the wheel balance machine.
3. Set the indicator as shown; inspect vehicle lateral run out and radial run out

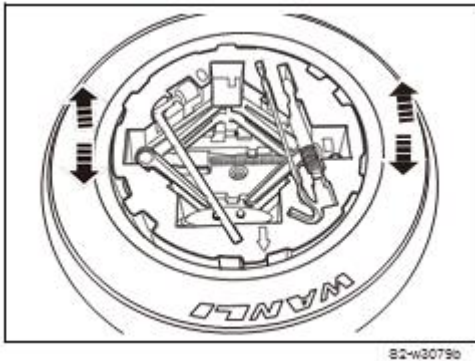
Radial run out: 1mm

Lateral run out: 0.3mm

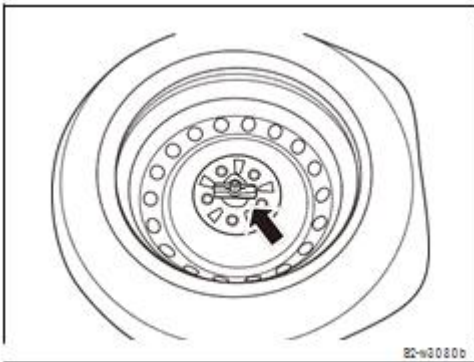
VII Spare tire

(I) Remove

1. Remove the spare tire
 - 1). Open the trunk lid.
 - 2). Uncover spare tire cover.
 - 3) Get the vehicle tool box.



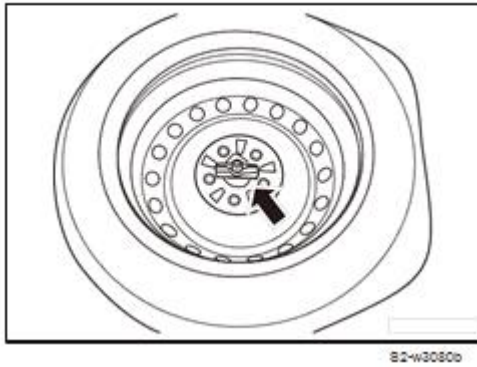
- 4) Loosen stud fixing the spare tire stud assembly.
- 5) Remove the spare tire.



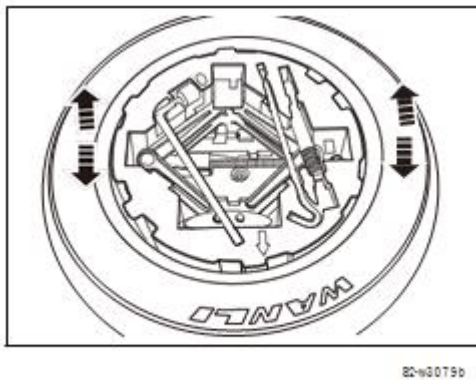
(II) Installation

1. Install the spare tire
 - 1) Place the spare tire well.
 - 2). The fixing stud of spare tire stud assembly is screwed into the rear body floor, the plastic part of the spare tire stud assembly should fit with the rim center of the hole edge.

Tightening torque 25 ~ 35N • m



- 3) Load the vehicle tool box.
- 4) Close the spare tire cover.
- 5) Close the trunk lid.

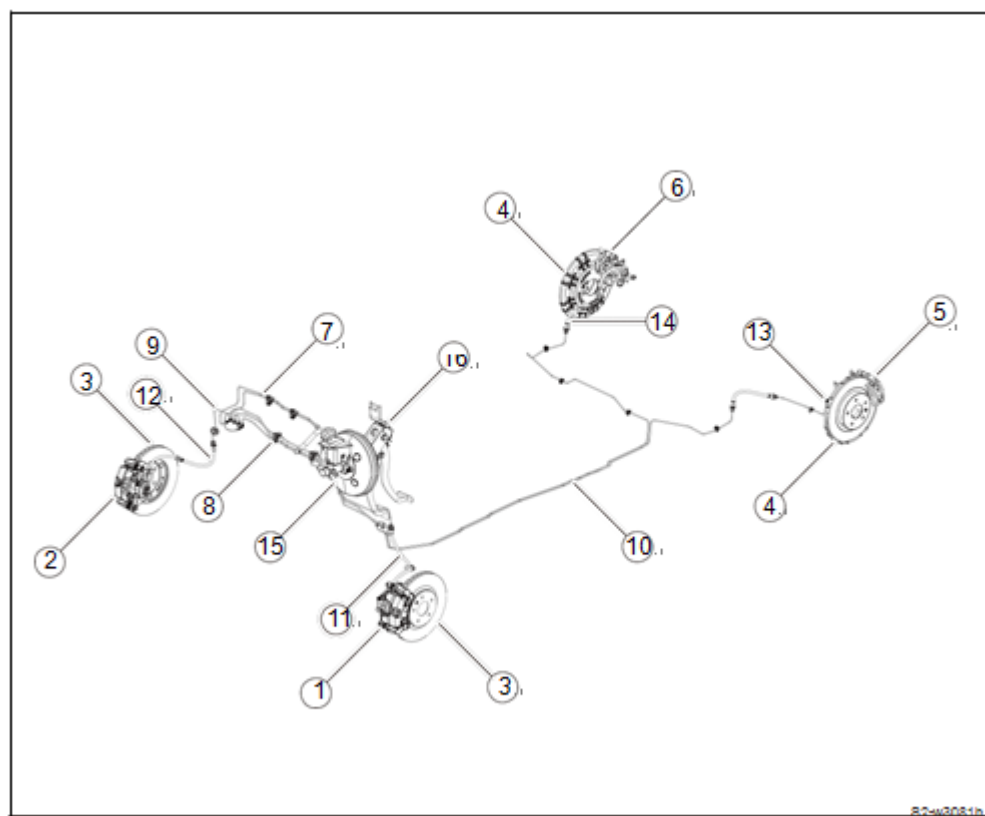


Brake system

I. Overview

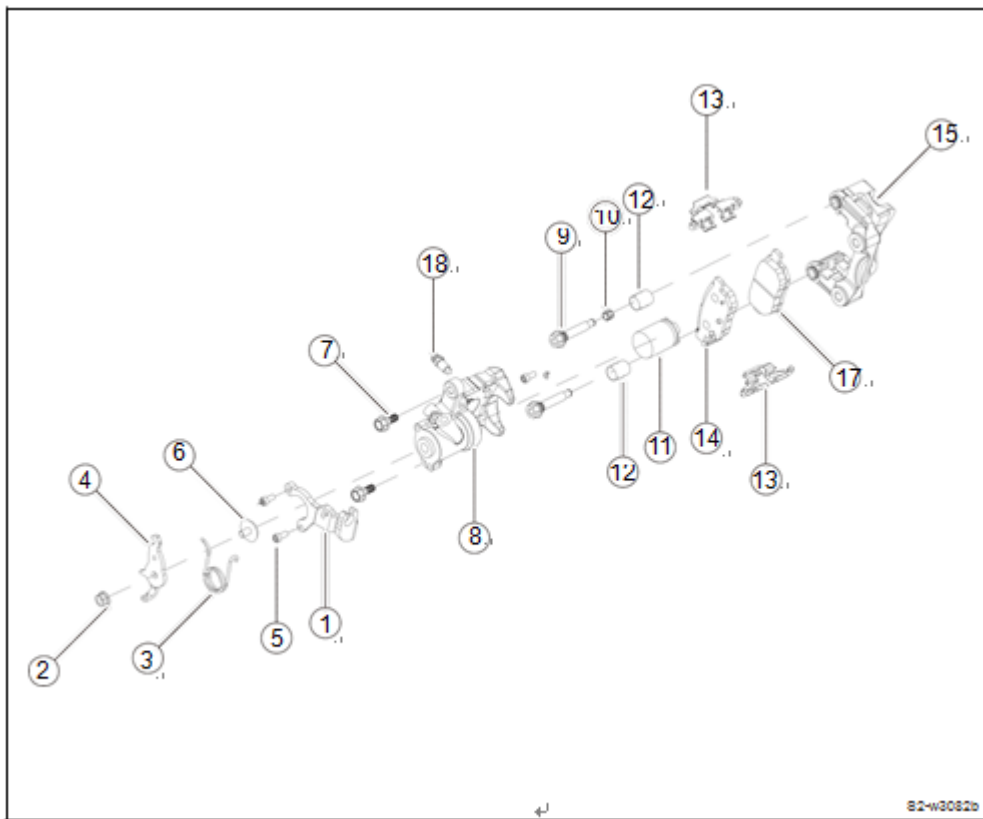
(I) Structure Summary

Brake system diagram (front & rear plate models)



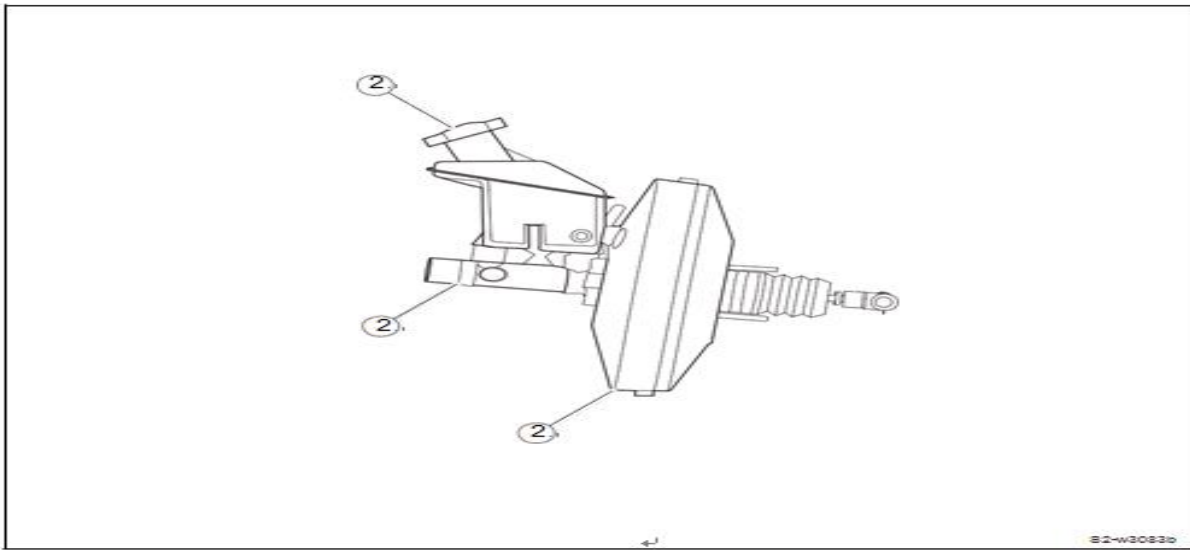
1. Left front brake caliper assembly
2. Right front brake caliper assembly
3. Front brake discs
4. Rear brake disc
5. Left rear brake caliper assembly
6. Right rear brake caliper assembly
7. Master cylinder flow lines assembly
8. Front brake exhaust pipe assembly
9. Right front brake pipe assembly
10. Rear brake exhaust pipe assembly
11. Left front brake hose assembly
12. Right front brake hose assembly
13. Left rear brake hose assembly II
14. Right rear brake hose assembly II
15. Vacuum booster with brake master pump assembly
16. Brake pedal assembly

Rear disc brake caliper structure (Front & Rear plate models)

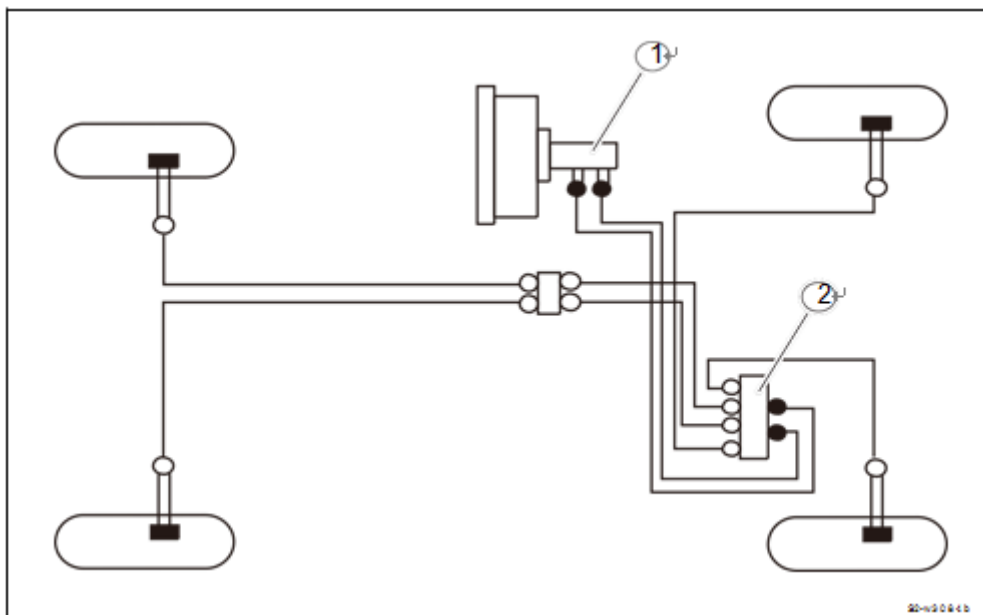


1. The guide seat
2. Strut nut
3. The torsion spring
4. Strut
5. Guide seat bolt
6. Plug
7. Hex head bolt
8. Cylinder
9. The Under-pin
10. The bushing
11. Piston composition
12. Dust cover
13. The yoke spring
14. The inner brake assembly
15. Bracket
16. Bleeder screw and nut
17. The outer brake assembly

Vacuum booster assembly diagram



1. The vacuum booster
 2. The master cylinder
 3. Brake fluid reservoir
- Hydraulic line chart



1. Brake master cylinder
2. ABS / ESP module assembly

(II) Maintenance data and Specifications

Item		Specifications
master cylinder	type	Cascade
	cylinder bore	22.22mm
brake booster	type	vacuum
	Size (size)	10 inches
	assist ratio	7.3:1
Front brake (front disc rear drum type)	type	Floating type/ventilated disc
	Brake disc diameter	256mm
	Brake disc thickness	22mm
	Friction block thickness	10.8mm
	cylinder bore	54mm
Rear brake (front disc rear drum type)	type	Drum brake
	Sub brake disc diameter	17.46mm
	Brake disc thickness	204mm
	Friction block thickness	4mm
Front brake (front disc rear disc type)	type	Floating type/ventilated disc
	Brake disc diameter	294mm
	Brake disc thickness	25mm
	Friction block thickness	9.5mm
	cylinder bore	54mm
Rear brake (front disc rear disc type)	type	Floating type/ventilated disc
	Brake disc diameter	275mm
	Brake disc thickness	9mm
	Friction block thickness	8mm
	cylinder bore	34mm

(III) Torque parameters

No.	Item	Torque (N • m)	Remarks
1	front brake caliper and knuckle connecting bolt	75~85	
2	rear brake caliper and torsion beam bolt	65~75	
3	rear brake and rear hub connecting bolt	65~85	
4	front and rear brake caliper bleeder screw	7~13	
5	brake pedal upper bracket bolt	20~25	
6	brake pedal fixing nut	20~25	
7	brake hose and brake caliper bolt	25~30	
8	brake hardware fittings	16~18	

(IV) Maintenance Precautions

1. All brake lines should not be excessive bending, twisting and stretching.
2. Verify that all vehicle brake lines do not interfere with other parts at ease or during steering.
3. The brake lines is an important safety part, always tighten its fixture. If found damaged parts, replace the applicable component.
4. When disconnecting the brake pipe, please seal the connector end to avoid dust entering.
5. "DOT 4" brake fluid is recommended.
6. Do not reuse drained brake fluid.
7. Be careful not to splash brake fluid on painting, to avoid damaging the paint. If splashed on painted areas, wash clean immediately with water.
8. Please wash with clean brake fluid all parts in the brake cylinder.
9. Do not use gasoline or kerosene and other mineral oil, to avoid damaging the rubber parts of the hydraulic system.
10. Please use a dedicated pipe wrench when removing and installing tube, during brake tube installation, be sure to check tightening torque.
11. After repairing or replacing brake discs, brake shoes, or appear lack of brake with a very short distance, be sure to run-brake joint surface.
12. Make sure there is no brake fluid on the brake disc, do not spill brake fluid on the brake disc, otherwise it will lead to brake failure.

II. Fault diagnosis

(I) Fault diagnosis table

Common braking system fault finding chart

No.	Failure Cause	Failure Analysis	Solution	Remark
1	when braking the vehicle deviate to one side	insufficient left & right tire pressure	adjust	
		Front wheel adjusted incorrectly	adjust	
		Brake shoe has poor contact	adjust	
		Brake shoe surface has grease or oil	replace	
		brake drum eccentric or unevenly	replace	
		Brake cylinder assembly adjusted	adjust	
		Self-adjusting mechanism is faulty	adjust	
2	insufficient braking force	lack of brake fluid or contaminated	Refill to replace	
		Brake system has air	Drain the system	
		The brake booster is faulty	Adjust	
		Brake shoe has poor contact	Adjust	
		Brake shoe surface has grease or oil	Replace	
		Self-adjusting mechanism is faulty	Adjust	
		Dragging brake shoe and brake rotating parts cause overheating	Adjust	
		brake lines limits	Adjust	
3	Increase the pedal stroke	Brake system has air	Drain the system	
		Brake fluid leak	Adjust	

	(pedal to the floor to reduce the distance)	Self-adjusting mechanism is faulty	Adjust	
		Pushrod to the brake master cylinder gap is too big	Adjust	
No.	Failure	Failure Analysis	Solution	Remark
4	Brake hysteresis	parking brake is not fully liberalized	liberalize	
		parking brake improperly adjusted	adjust	
		Brake pedal return spring worn	replace	
		Brake master cylinder reservoir port restrictions	adjust	
		Rear drum brake return spring damaged	replace	
		lading parts insufficient lubrication	lubricate	
		One-way valve or the master cylinder piston return spring defective	replace	
		master cylinder pushrod and gap is too small	lubricate	
5	parking brake function is insufficient	rear brake shoe damage	adjust	
		The surface of rear brake shoe has grease or oil	replace	
		Parking brake fastener jammed	adjust	
		Self-adjusting mechanism is faulty	adjust	
		The parking brake lever stroke is too big	adjust	
6	Braking force is insufficient	pipe joints or brake cylinder cups leak	wipe clean and tighten or	
		Pipeline residual exhaust air is not	drain	
		Shoe drum gap is too large	retune	
		Hoof surface sticky oil or hardened	friction or replace	
		The drum overheating, pipe vapor resistance	Replace, cooling, drain	
7	brake is hard to release	brake cylinder cups back to the hole	expansion or replace	
		drum shoe gap is too small	retune	
		Shoe return spring elastic weakened or broken	replace	
		Hoof or floor deformation, return	Adjust or replace	
8	noise	rear brake shoe severely worn	replace	
		Brake drum out of round	Cut and need balance performance verification	

		Rear brake shoe surface is too smooth, when friction coefficient is small and the brake pressure is high, the noise will be generated when friction and slipping the smooth surface or when there is foreign object between the extrusion friction surface	After clearing the foreign object, use sandpaper to polish brake shoe	
9	Brake dragging caused brake drum heating	brake gap and pedal free travel is too small, when release the brake pedal, the braking force is not fully liberated, so that the friction lasts a long time; cause start difficulties, driving weakness, when touches the surface of the drum, it is hot	readjust the brake timing and gap according to the request	
		brake handle is not fully liberalized, caused by negligent operation or improper adjustment, resulting in a long time friction and heat	If necessary adjustments according to specifications	
		The heat generated by braking causes return spring thermal deformation, the elastic force decline or disappear, which makes that it after braking it cannot guarantee that brake shoe assembly return in time, the heat of the brake and brake drum cannot be completely removed	repair or replace the return spring to eliminate failure	
10	Parking failure	Common brush or jacket rust, traction spring break, fall off or elasticity disappear, causing parking brake control drawing or brake drawing is not flexible in its coat, which makes the parking brake does not release and cause failure.	Check whether there is injury of the brake systems and brake parts drawing surface, handle maneuvers whether flexible and without jam, the connection of drawing is loose and the fixed portion is damaged, repair or replace parts if necessary.	

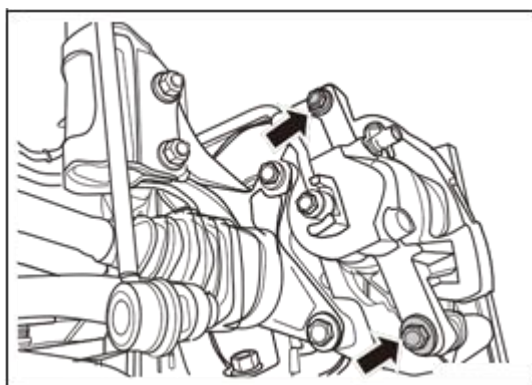
III. Front brake pad friction plate

(I) Remove

△ Note To maintain wheel balance, before removing the tire, mark the relative positions of the wheel.

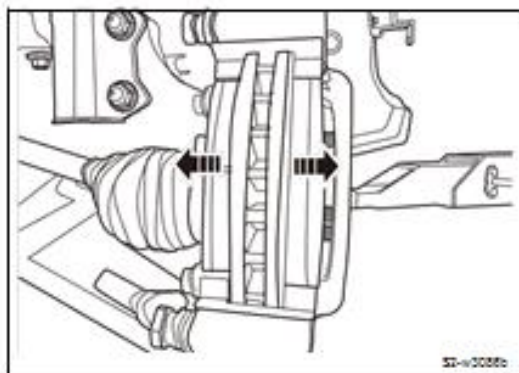
1. Remove wheels refers to the wheels
2. Remove the front brake caliper friction plate group
 - 1). Remove mounting bolts of the brake caliper assembly positioning pin.
 - 2). Flip caliper clamp body assembly.

△ Note avoid pulling the brake hose



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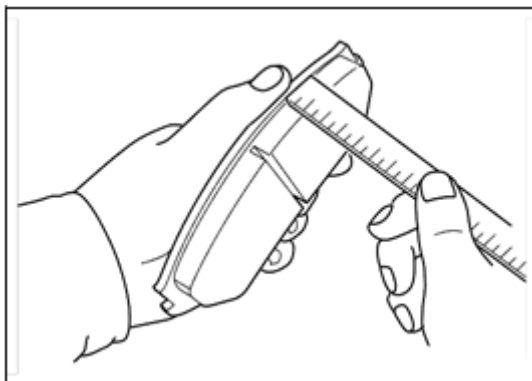
- 3). Remove the inner and outer brake pads.



(II) Check

1. Check the thickness of brake shoe (disc brakes)
 - 1). Check brake shoe thickness with the scale.
 - Front brake caliper Standard lining thickness (front disc rear drum models): 11mm
 - Front brake caliper pad wear limit thickness (front disc rear drum models): 2mm
 - Front brake caliper standard lining thickness (front disc rear disc models): 9.5mm
 - Front brake caliper pad wear limit thickness (front disc rear disc models): 2mm
 - Rear caliper standard lining thickness (front disc rear disc models): 8mm
 - Front brake caliper pad wear limit thickness (front disc rear disc models): 2mm

△ Note that if the brake shoe thickness less than the thickness of the wear limit, replace the brake shoe

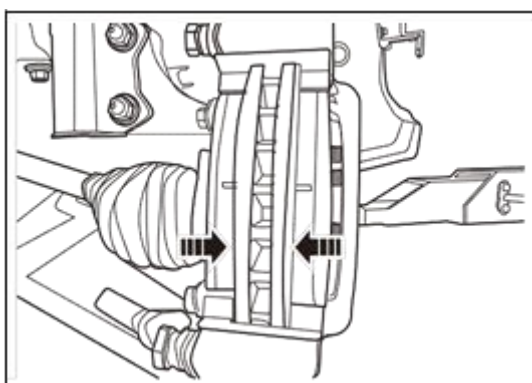


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(III) Installation

1. Install the caliper lining

- 1). Mount the caliper brake friction plate on the caliper bracket.

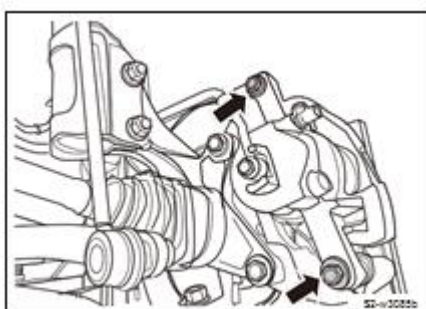


- 2) Install front brake caliper assembly positioning pin fixing bolts and tighten.

Tightening torque 35 ~ 45N • m

- 3). Fix brake disc, tread the brake pedal until the brake respond.

- 4) Check the rotation resistance of brake caliper.



- 5) Install the wheel

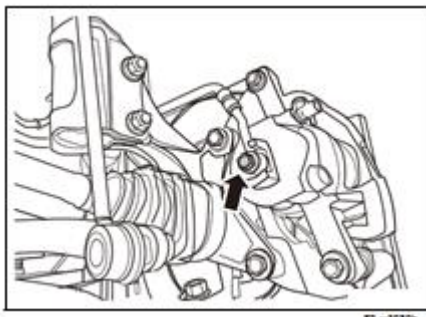
IV. Front brake caliper assembly

(I) Remove

1. Remove the wheels refers to the wheels
2. Discharge brake fluid refers to brake fluid
3. Remove the front brake caliper assembly

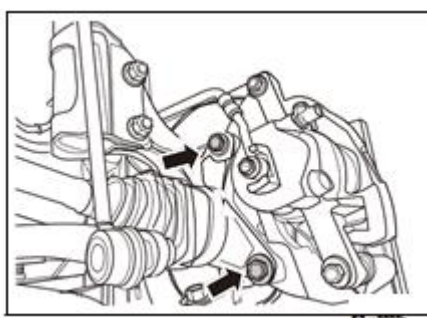
1). Remove the brake hose bolts and copper washer connecting brake hose and front brake caliper.

△ Note attention not to drop copper washer on both ends of the bolt



2). Remove the two mounting bolts connecting the front brake caliper assembly and steering knuckle.

3) Remove the front brake caliper assembly.



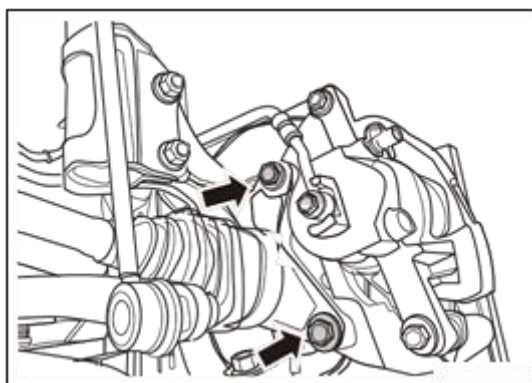
(II) Installation

1. Install the front brake caliper assembly

1). Place the caliper assembly to the mounting position, pre-tightening two mounting bolts connecting clamp caliper assembly and steering knuckle.

2) Tighten two mounting bolts connecting clamp caliper assembly and steering knuckle.

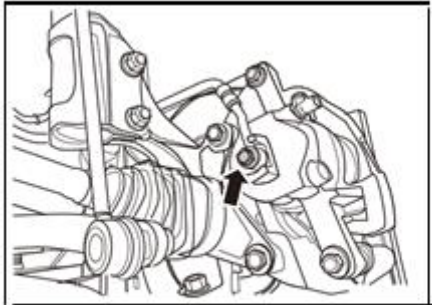
Tightening torque 75 ~ 85N • m



3) Install the caliper bolts and copper washers connecting the front brake hose and front brake hose.

Tightening torque 25 ~ 30N • m

2. Fill brake fluid refers to brake fluid
3. Drain brake system exhaust refers to the brake system exhaust
4. Install the wheel

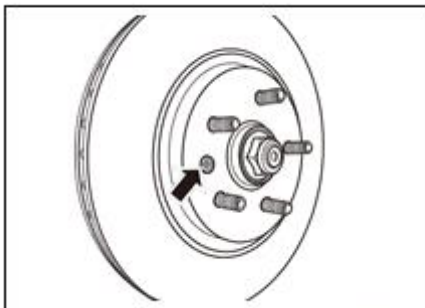


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V. Front brake discs

(I) Remove

1. Remove the wheels refers to the wheels.
2. Remove the front brake caliper assembly refers to front brake caliper assembly.
3. Remove the front brake disc.
 - 1). Remove the brake discs on the front cross screws.
 - 2) Remove the front brake discs.



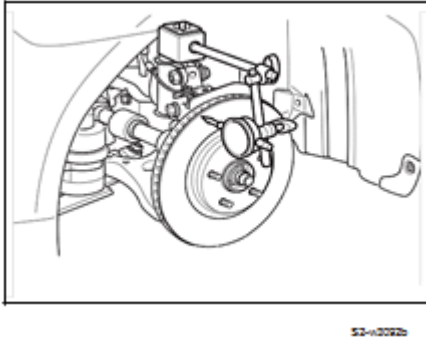
52-00015

(II) Check

1. Visually check

Check whether there is front brake disc surface uneven wear, cracks and badly damaged. If yes, please replace it.
2. Check run out
 - 1) Fix front brake disc to the hub.

△ Note before measurement, make sure the wheel bearing axial clearance should not be too large.
 - 2) Use a dial indicator to check run out. It can be measured at 10mm inside edge of the brake disc
Run out limit: 0.05mm
 - 3) If the run out exceeds the limit, replace the brake disc or make the necessary processing.

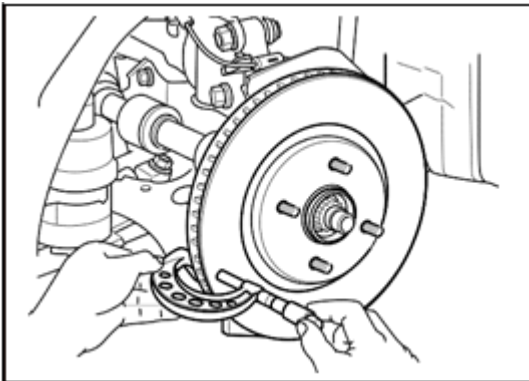


3. Check the thickness

- 1) Use a micrometer to check the brake disc thickness. If the thickness is less than wear limit, replace the brake disc.

Standard thickness (front disc rear drum models): 22mm wear limit (front disc rear drum models):

20.4mm standard thickness (front disc rear disc models): 25mm wear limit (front disc rear disc models):
23mm



(III) Installation

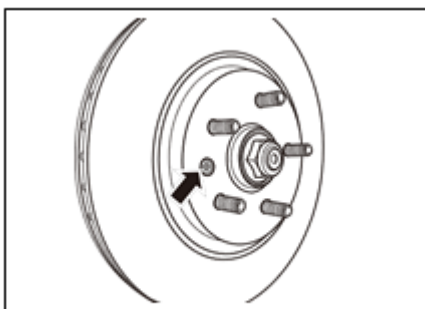
1. Install the front brake discs

- 1) Install the front brake discs.
- 2) Tighten the cross-shaped screws.

Tightening torque 10 ~ 15N • m

2. Install the front brake caliper assembly

3. Install the wheel



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VI. Rear brake pad lining

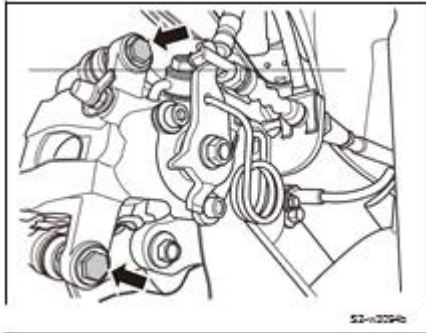
(I) Remove

- △ Note To maintain wheel balance, before removing the

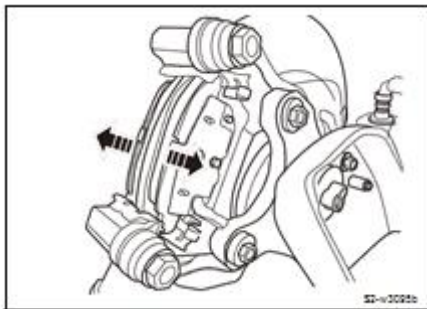
tire, mark the relative positions of the wheel.

1. Remove the rear wheel refers to wheels.
2. Remove the rear brake caliper lining
 - 1). Lower the parking brake.
 - 2) Demolition two mounting bolts of rear caliper positioning pin.
 - 3) Flip rear caliper clamp body assembly.

△ Note avoid pulling the brake hose



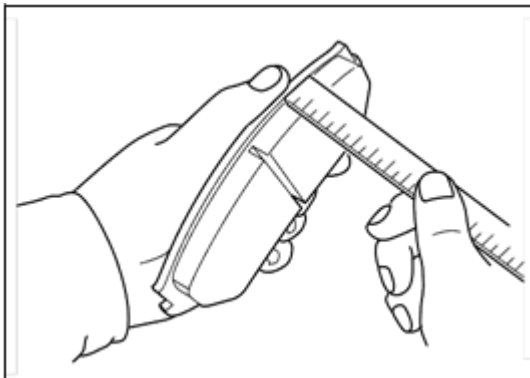
- 4). Remove the inner and outer brake pad lining.



(II) Inspection

1. Check thickness of the brake pads friction plates
 - 1). Check the thickness with the caliper scale lining. Brake caliper lining standard thickness (front disc rear disc models): 8mm rear brake caliper pad wear limit thickness (front disc rear disc models): 2mm

△ Note that if the brake shoe thickness less than the thickness of the wear limit, replace the brake caliper lining

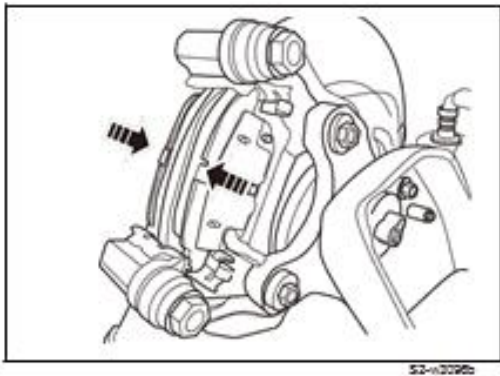


(III) Installation

1. Install the caliper lining

1). Mount the brake caliper friction disc to the brake caliper mounting bracket.

△ Note install in accordance with the friction plate pad and friction plate retaining ring direction



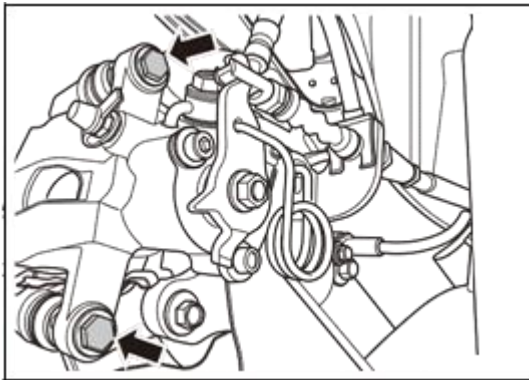
2) Install rear brake caliper assembly positioning pin fixing bolts and tighten

Tightening torque 22 ~ 32N • m

3). Fix brake disc, tread the brake pedal until the brake respond.

4) Check the rotation resistance of brakes.

2. Install the rear wheels



VII Rear brake caliper assembly

(I) Remove

1. Remove the wheels refers to wheels

2. Discharge brake fluid refer to brake fluid

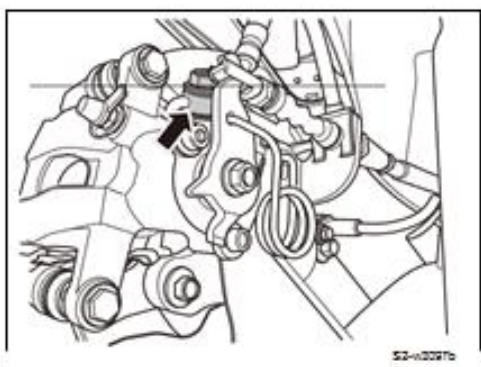
3. Remove the rear brake caliper assembly

1). Lower the parking brake.

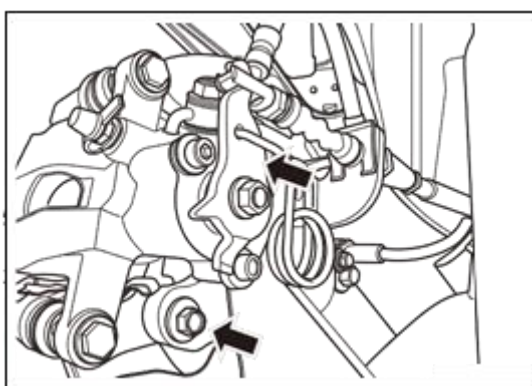
2) Remove the brake hose bolts and copper washers connecting to the rear brake hose and the rear brake caliper.

△ Note attention not to drop copper washer at both ends of

the bolt

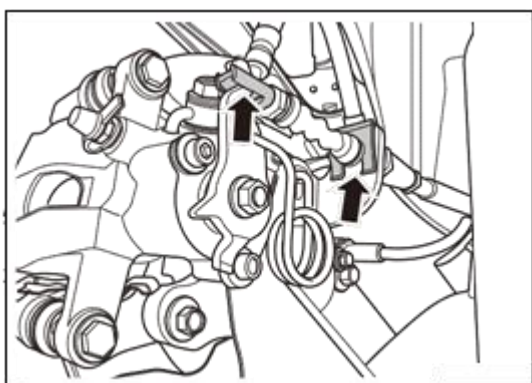


3) Demolition two mounting bolts connecting rear caliper assembly and rear torsion beam assembly.



4) Remove fixing nuts and cards connecting rear brake caliper assembly and rear parking brake drawing; disengage the rear brake caliper assembly and rear parking brake drawing.

5) Remove the rear brake caliper assembly.



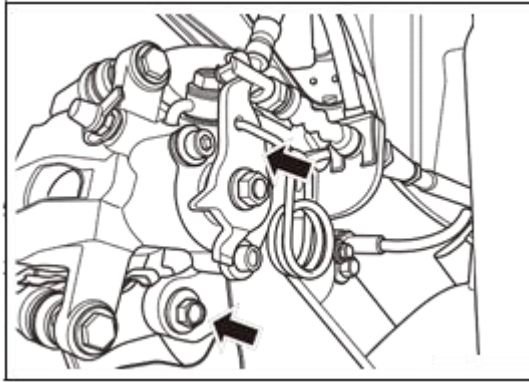
(II) Installation

1. Install the rear brake caliper assembly

1). Place the rear caliper assembly to the mounting position, pre tighten brake caliper mounting bracket bolts.

2). Tighten two mounting bolts connecting the rear caliper assembly and torsion beam assembly.

Tightening torque 65 ~ 75N • m



3) Install brake hose bolts and copper washers connecting the rear brake hose and brake pad.

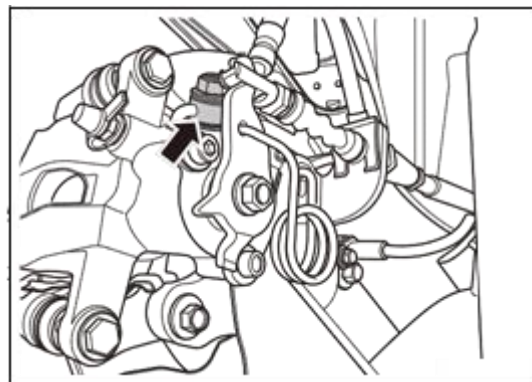
Tightening torque 25 ~ 30N • m

4) Install rear brake caliper assembly and rear parking brake drawing connections.

2. Fill brake fluid refers to brake fluid.

3. Drain brake system exhaust refers to brake system exhaust.

4. Install the wheel



VIII Rear brake disc

(I) Remove

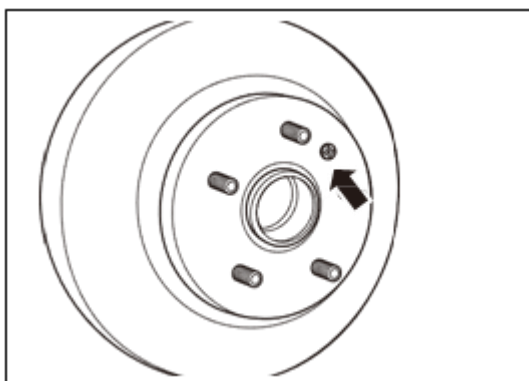
1. Remove the wheels refers to wheels

2. Remove the rear brake caliper assembly refers to the rear brake caliper assembly

3. Remove the rear brake disc

1). Remove the brake disc rear cross screws.

2). Remove the brake disc



(II) Check

1. Visually check

Check that whether there is the rear brake disc surface uneven wear, cracks and badly damaged. If there is, replace it.

2. Check run out

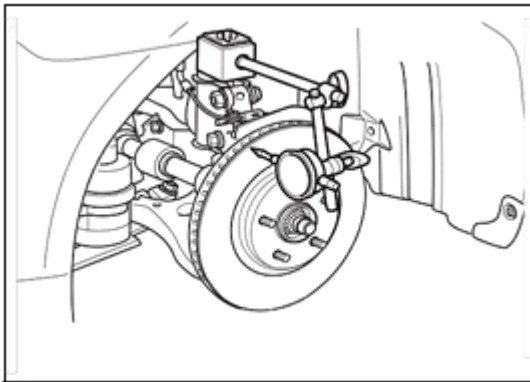
1) Fix the rear brake disc to the hub.

△ Note before measurement, make sure the wheel bearing axial clearance should not be too large.

2) Use a dial indicator to check run out. It can be measured at the 10mm inside edge of the brake disc

Run out limit: 0.05mm

3) If the run out exceeds the limit, replace the brake disc or make the necessary processing

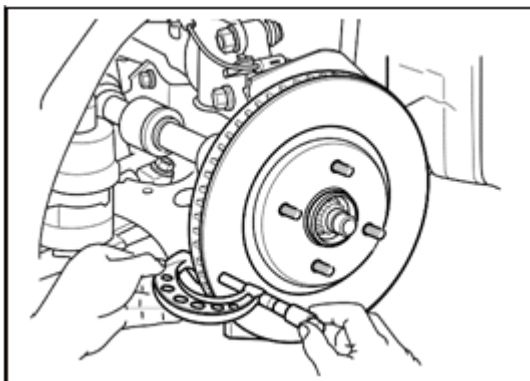


3. Check the thickness

1) Use a micrometer to check the brake disc thickness. If the thickness is less than wear limit, replace the brake disc.

Standard rear brake disc thickness (front disc rear disc models): 9mm

Rear brake disc wear limit (front disc rear disc models): 8mm



(III) Installation

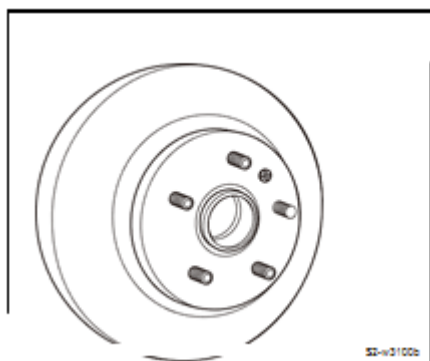
1. Install the brake disc

1) Install the rear brake disc.

2) Tighten the cross screws.

Tightening torque 10 ~ 15N • m

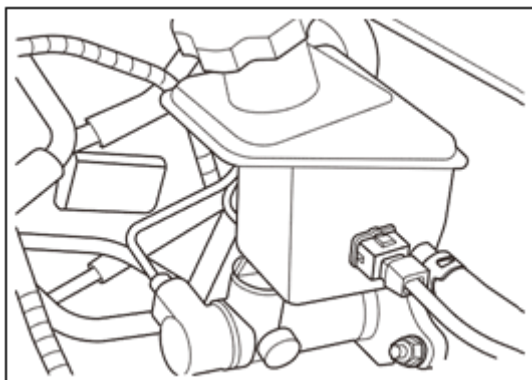
2. Install the rear brake caliper assembly
3. Install the wheel



IX Brake fluid

(I) Check

1. Check the brake fluid level
 - 1) Verify whether the brake fluid level oiler height is within a predetermined range
Standard size between mark MAX and MIN
 - 2) If the level is too low, Check whether brake system and surrounding oiler leaks.



(II) Brake fluid discharge

1. Drain brake fluid
 - 1) Open the brake fluid filler cap.
 - 2) Place drip pan.
 - 3). Empty brake fluid
 - 4) Install the brake fluid filler cap.

△ Note cover with a cloth or piece of cloth on the painted surface to prevent brake fluid adhesion.

(III) Fill brake fluid

1. Fill brake fluid
 - 1). Depress the brake pedal several times until the complete elimination of the vacuum booster pressure.
 - 2) Open the brake fluid filler cap.
 - 3). Fill the brake fluid.

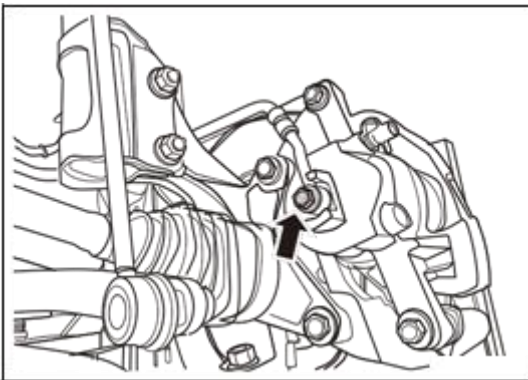
△ Note clean before open the front tank cover, only use brake fluid stored in a sealed container.

X. Front brake hose

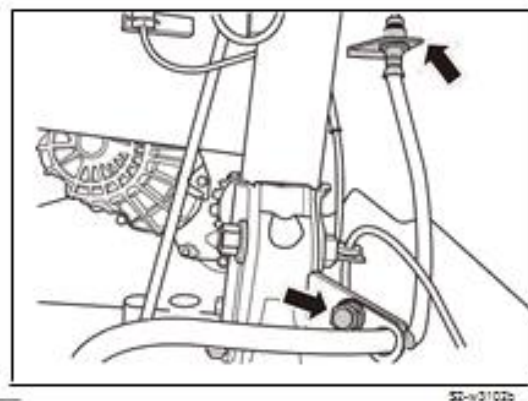
(I) Remove

1. Drain brake fluid refers to brake fluid
2. Remove the wheels refers to wheels
3. Remove the front brake hose
 - 1). Remove brake hose bolt and copper washers connecting the front brake hose and front brake caliper.

△ Note attention not to drop copper washers

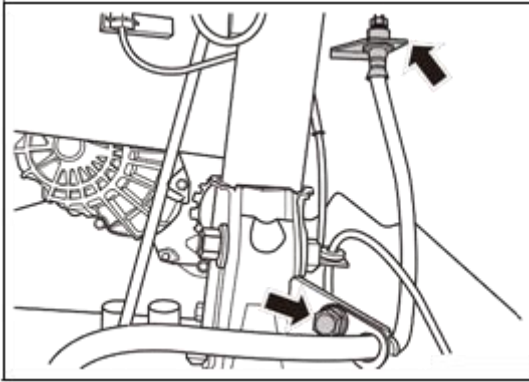


- 2). Remove the connector between the brake hose and brake hardware with a pipe wrench, disengage the card.
- 3). Remove fixing bolts connecting the central of brake hose and the front shock absorber.
- 4) Remove the front brake hose.



(II) Installation

1. Install the front brake hose assembly
 - 1) Install the card, install the brake hose and brake hardware connector with a pipe wrench.
Tightening torque 16 ~ 18N • m
 - 2) Install fixing bolts connecting the central of the brake hose and the front shock absorber.
Tightening torque 20 ~ 25N • m



3) Install brake hose bolts and copper washers connecting the front brake hose and front brake pads.

Tightening torque 25 ~ 30N • m

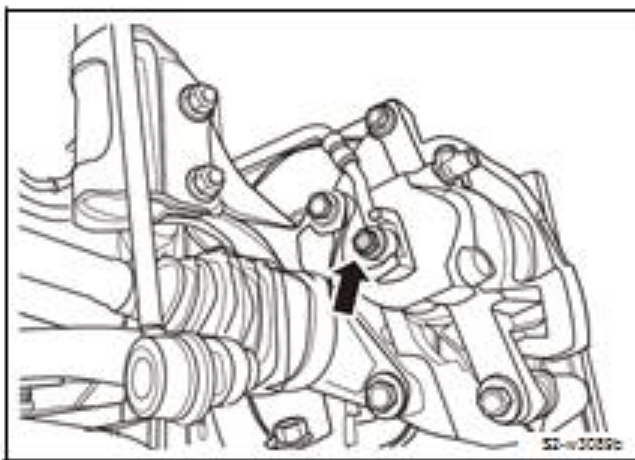
△ Note Do not reuse gaskets and tubing cards.

△ Note pay attention to the brake hose installation direction.

2. Install the wheel

3. Fill brake fluid refers to brake fluid

4. Drain brake system exhaust refers to brake system exhaust



XI. Rear brake hose assembly

(I) Remove

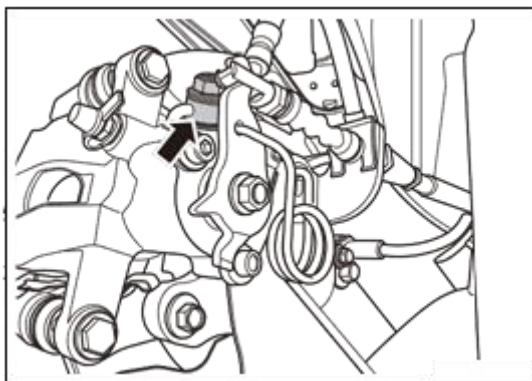
1. Drain brake fluid refers to brake fluid

2. Remove wheel refers to wheels

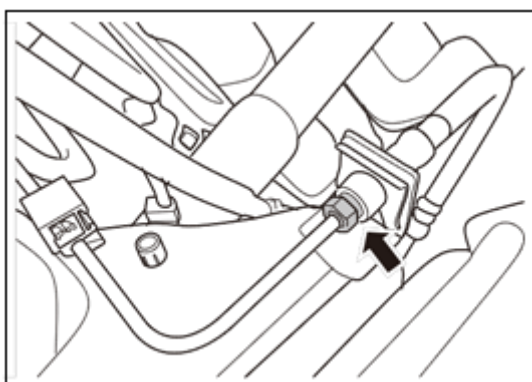
3. Remove the rear brake hose

1) Remove bolts and copper washers connecting the rear brake hose and rear brake caliper II.

△ Note attention not to drop copper washers



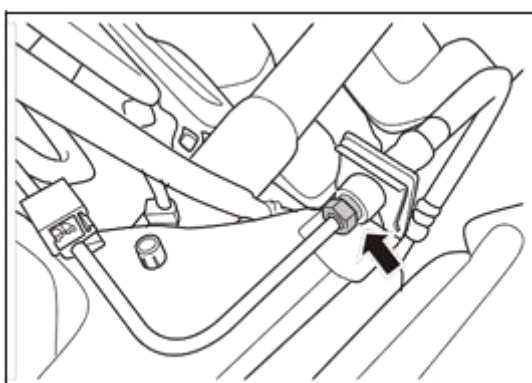
- 2). Remove the connector between rear brake hose assemblies II and the brake hardware with a wrench. Disengage the card.
- 3) Remove the rear brake hose assembly II.



(II) Installation

1. Install the rear brake hose assemblies II
 - 1) Install the card, the connector between rear brake hose assemblies II and the brake hardware with a wrench.

Tightening torque 16 ~ 18N • m



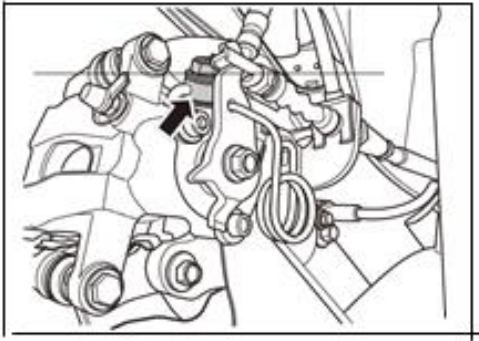
- 2) Install bolts and copper washers connecting the rear brake hose and rear brake caliper II..

Tightening torque 25 ~ 30N • m

△ Note Do not reuse gaskets and tubing cards.

△ Note pay attention to the brake hose installation direction.

2. Install the wheel
3. Fill brake fluid refers to brake fluid
4. Drain brake system exhaust refers to brake system exhaust

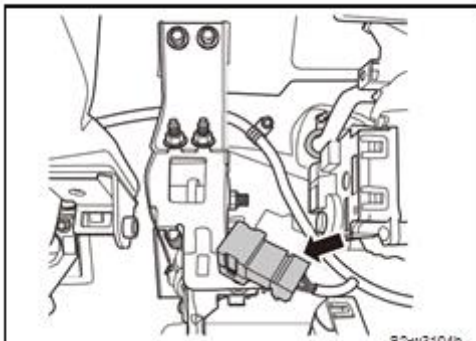


52-00087b

XII. Brake pedal (MT)

(I) Check and adjust

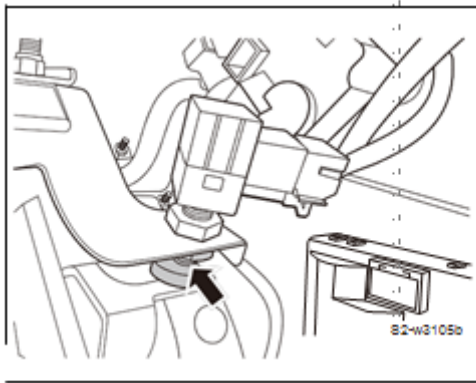
1. Adjust the clearance between the brake pedal and the brake limit switch bolt
 - 1). Remove guard assembly under the driving side.
 - 2) Disconnect the brake lamp switch harness connector.



3) Loosen the lock nut of brake limit switches, release the brake pedal.

4). Rotate switch bolt, keep the gap of switch bolt and the brake pedal between 0.5 ~ 1mm

Tightening torque 8 ~ 10N • m

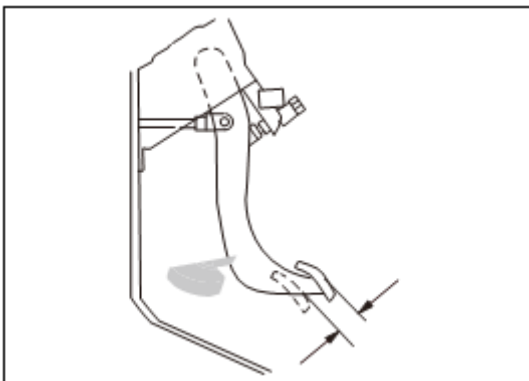


2. Check brake pedal free travel

- 1) When the engine stalls state, depress the brake pedal 2 or 3 times.
- 2) confirm the vacuum brake booster vacuum-elimination, pressed pedal with hand.
- 3) Before verify resistance occurs, check the brake pedal free travel is within the standard range.

Standard value: 3mm ~ 8mm

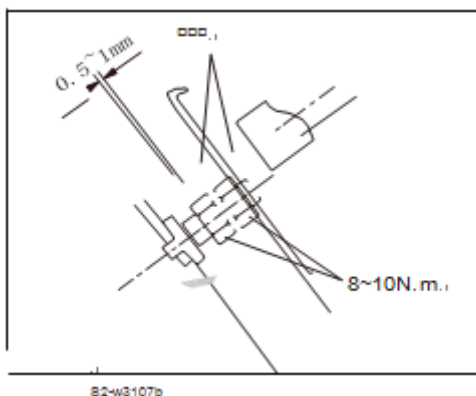
△ Note that if the free travel is not within the standard, replace the damaged parts.



3. Adjust the brake pedal free travel

- 1) Release the brake limit switch nut, relax the brake pedal, rotate switch bolt, and keep the gap of switch bolt and the brake pedal in 0.5mm ~ 1mm.

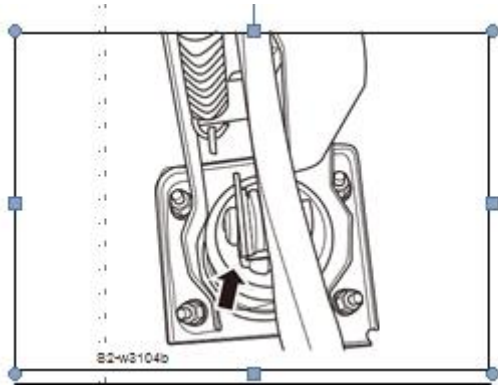
Free travel standard value: 3mm ~ 8mm



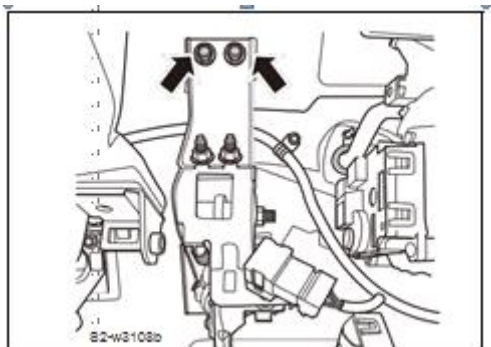
(II) Remove

1. Open the engine hatch
2. Disconnect the negative battery cable
3. Remove the lower part of the dashboard fender refers to the lower part of the dashboard fender
4. Remove the brake pedal

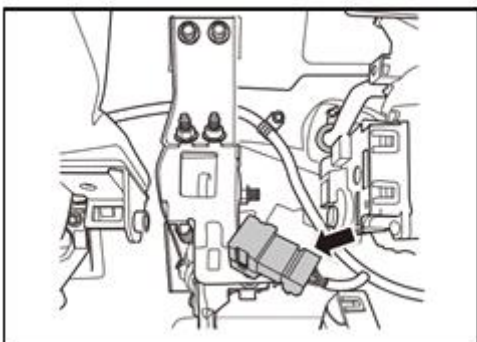
- 1) Disconnect the stop lamp switch harness connector.



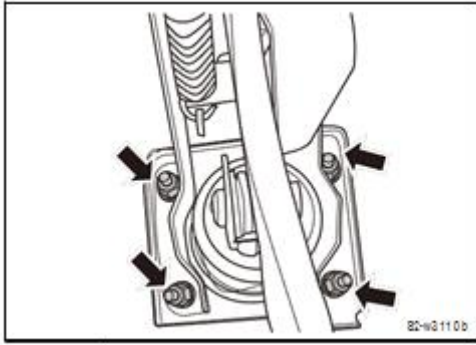
- 2). Remove lock pin connecting the brake pedal and the brake booster vacuum, disconnect the brake pedal and the brake booster vacuum



- 3) Remove the two fixing nuts connecting the brake pedal and the body.



- 4). Remove four fixing nuts connected the brake pedal and the vacuum booster to the vehicle body
- 5) Remove the brake pedal.

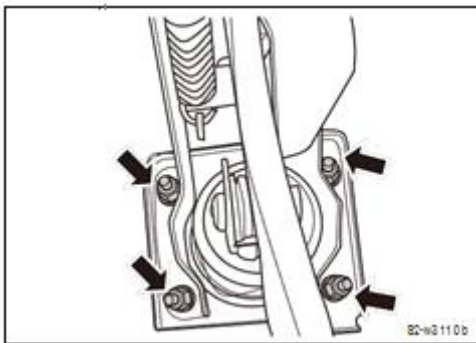


(III) Installation

1. Install the brake pedal

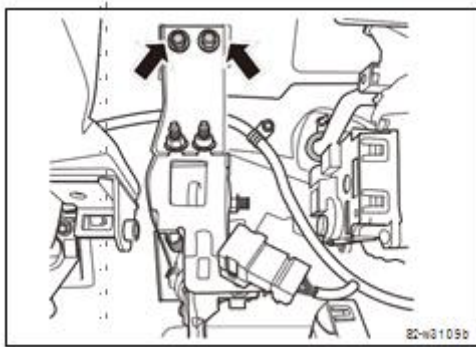
- 1) Install four fixing nuts connected the brake pedal and the vacuum booster to the vehicle body and pre-tighten.

Tightening torque 20 ~ 25N • m



- 2). Install the two fixing nuts connecting the brake pedal and the body and tighten.

Tightening torque 20 ~ 25N • m

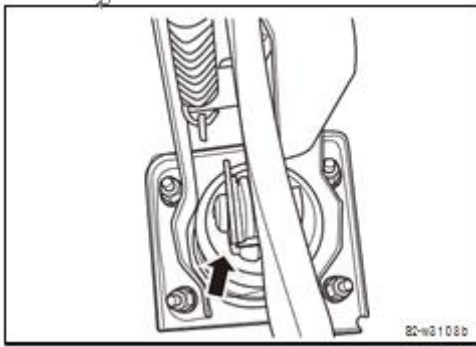


- 3) Install the brake pedal and the brake booster vacuum plastic ring, cotter pins, the main pump latch locking.

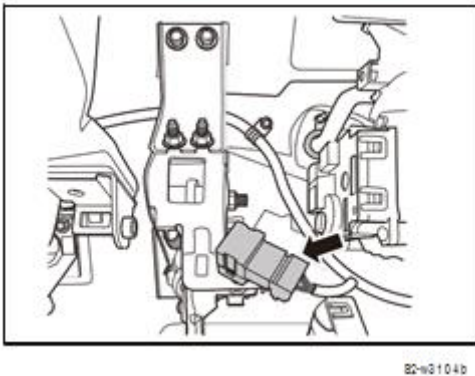
△ Note the main pump kingpin should be normally moving in the mounting hole with no jam phenomenon.

△ Note when the main pump kingpin cannot be installed according to requirements, adjust the pedal length of the bolt to ensure kingpin correctly fit, but do not adjust the length of vacuum booster pushrod, or keep the vacuum

booster pushrod in a compressed state.



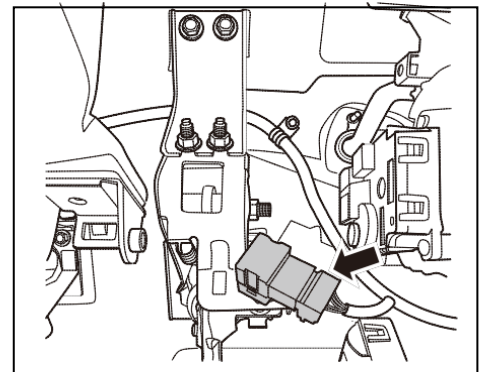
- 4) Connect the brake lamp switch harness connector.
2. Install the lower part of the dashboard fender
3. Connect the negative battery cable
4. Turn off the engine hatch



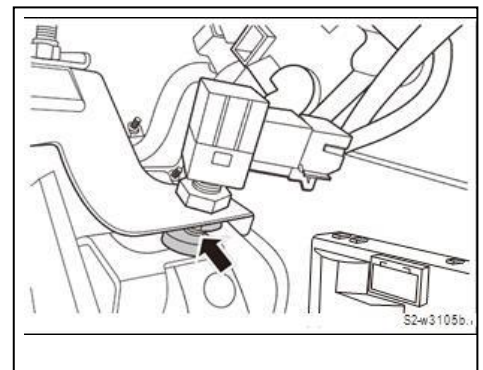
XIII. Brake light switch

(I) Disassembly

1. Open the engine hood
2. Disconnect the battery's negative cable
3. Remove the dashboard's bottom cover. Please refer to "dashboard's bottom cover"
4. Disassemble the brake light switch
 - 1). Disconnect the harness connector of brake light switch



- 2). Remove the fixed bolt of light switch
- 3). Remove the brake light switch



(II) Check

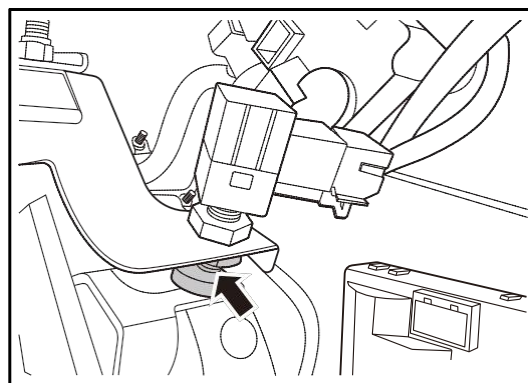
1. Check the brake light switch

- 1). Use multimeter to check the two terminals of light switch, and confirm whether it's brakeover when you turn on or off the light switch
- 2). If the terminals do not brake over when the switch is pushed more than 4mm in depth, and restore brake-over when you turn off the switch, then the brake light switch is functional

(III) Installation

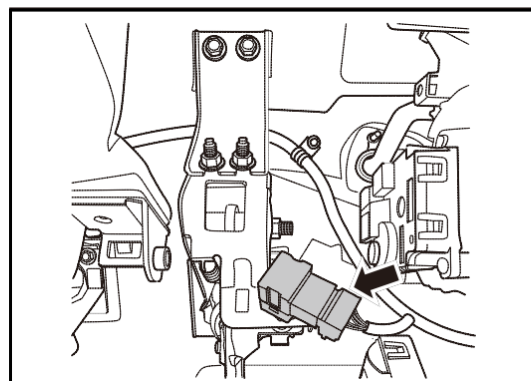
1. Install brake light switch

- 1). Install the fixed bolt of brake light switch (tightening torque: 20~25N.m)



- 2). Link the harness connector of brake light switch

2. Install the dashboard's bottom cover
3. Connect the battery's negative cable
4. Close the engine hood



XIV. Unit assembly of vacuum booster with master cylinder (MT)

(I) Check on the car

1. Check fluid leakage

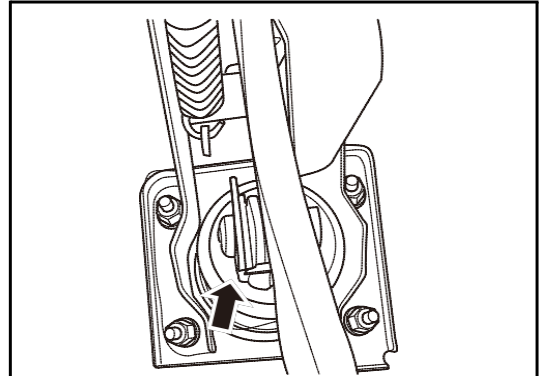
- 1). Check whether leakage exists on the fitting surface of master cylinder, oilcan or brake hose's joint

(II) Disassembly

1. Open the engine hood.
2. Disconnect the battery's negative cable

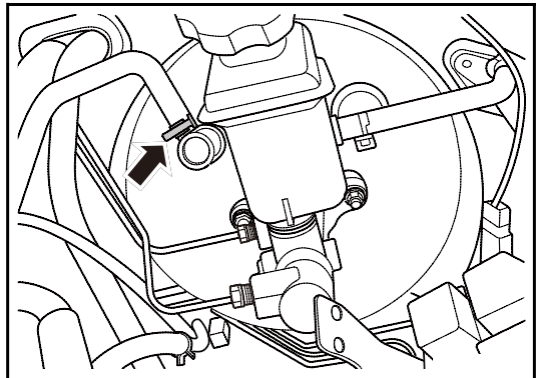
3. Drain the brake fluid (please refer to “brake fluid”)
4. Remove the liquid level sensor of brake fluid (please refer to “liquid level sensor of brake fluid”)
5. Remove the vacuum booster with master cylinder

- 1). Remove the lockpin that connects vacuum booster and brake pedal

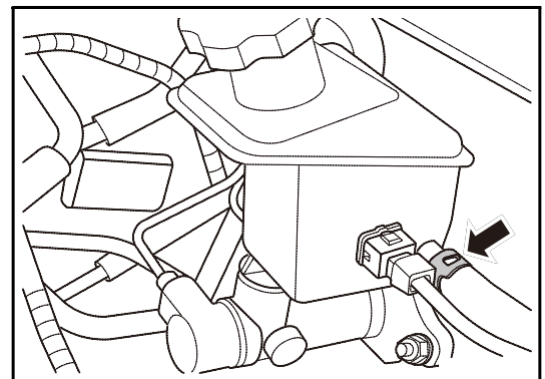


- 2). Remove the girdle clamp and disconnect vacuum booster and hose

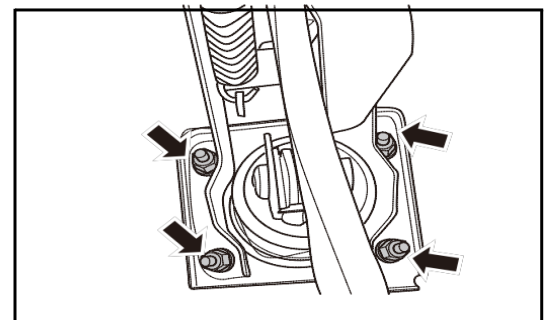
- 3). Disconnect the master cylinder and its outlet tube assembly



- 4). Remove the girdle clamp and disconnect brake master cylinder and the hose of clutch master cylinder



- 5). Remove the four screws that connect vacuum booster and brake pedal

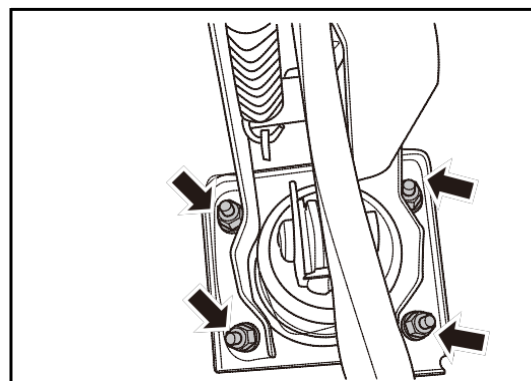


(III) Installation

1. Install the unit assembly of vacuum booster with master cylinder

1). Install the four screws that connect vacuum booster and brake pedal.

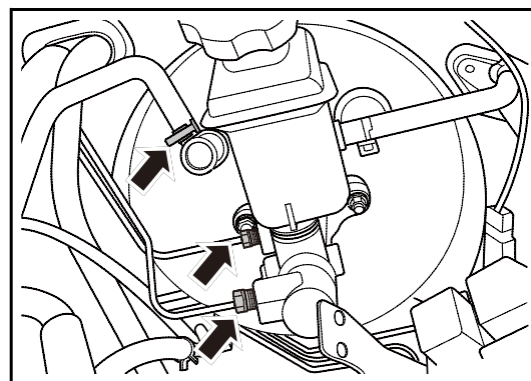
(tightening torque: 20~25N.m)



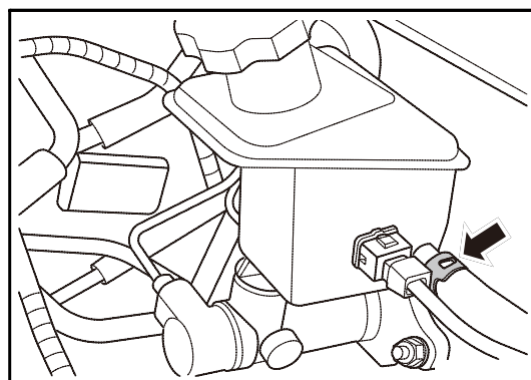
2). Install the connection of master cylinder and its outlet tube

(tightening torque: 16~18N.m)

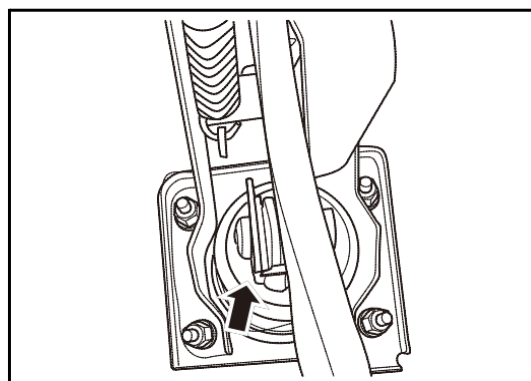
3). Install the girdle clamp to connect vacuum booster and its hose



4). Install the girdle clamp to connect the hose that links brake master cylinder and clutch cylinder



5). Install the lockpin and cotter that connect vacuum booster and brake pedal



2. Install the liquid level sensor of brake fluid
3. Add the brake fluid (please refer to “brake fluid”)
4. Exhaust air inside the brake system (please refer to air-removal of brake system)
5. Connect the battery’s negative cable
6. Close the engine hood

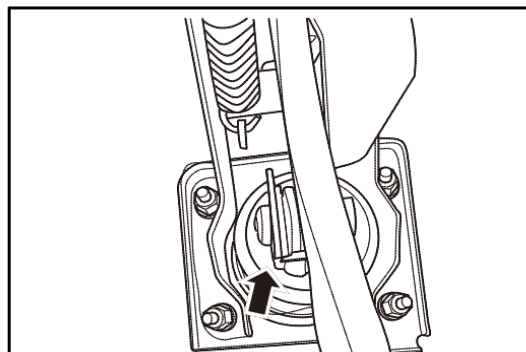
XV. Unit assembly of vacuum booster with master cylinder (AT)

(I) Check on the car

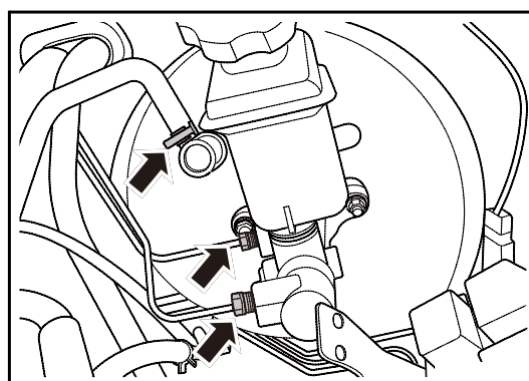
1. Check fluid leakage
 - 1). Check whether leakage exists on the fitting surface of master cylinder, oil can or brake hose’s joint

(II) Disassembly

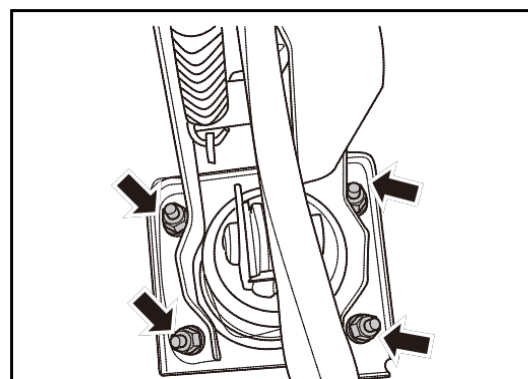
1. Open the engine hood
2. Disconnect the battery’s negative cable
3. Drain the brake fluid (please refer to “brake fluid”)
4. Remove the liquid level sensor of brake fluid (please refer to “liquid level sensor of brake fluid”)
5. Remove the vacuum booster with master cylinder
 - 1). Remove the lockpin that connects vacuum booster and brake pedal



- 2). Remove the girdle clamp and disconnect vacuum booster and hose
- 3). Disconnect the master cylinder and its outlet tube assembly



- 4). Remove the four screws that connect vacuum booster and brake pedal

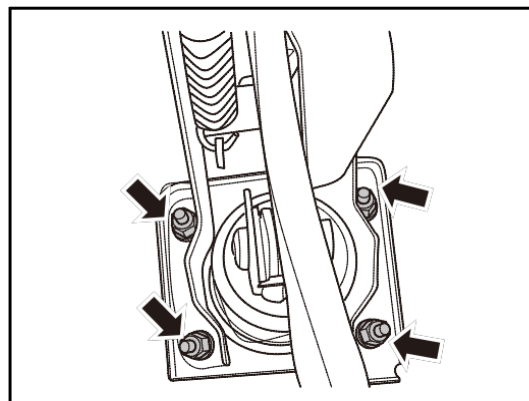


(III) Installation

1. Install the unit assembly of vacuum booster with master cylinder

1). Install the four screws that connect vacuum booster and brake pedal

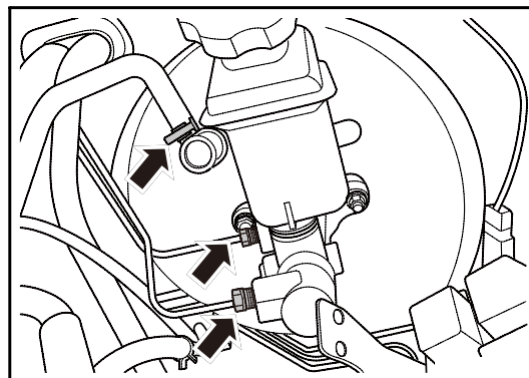
(tightening torque: 20~25N.m)



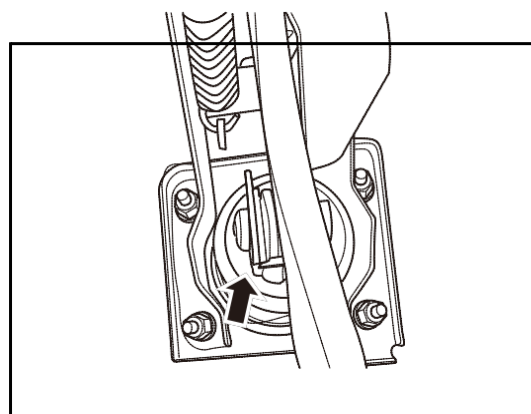
2). Install the joint between master cylinder and its outlet tube assembly

(tightening torque: 16~18N.m)

3). Install the girdle clamp to connect the vacuum booster and its hose



4). Install the lockpin and cotter that connect vacuum booster and brake pedal



2. Install the liquid level sensor of brake fluid

3. Add the brake fluid (please refer to “brake fluid”)

4. Exhaust air inside the brake system (please refer to air-removal of brake system)

5. Connect the battery’s negative cable

6. Close the engine hood

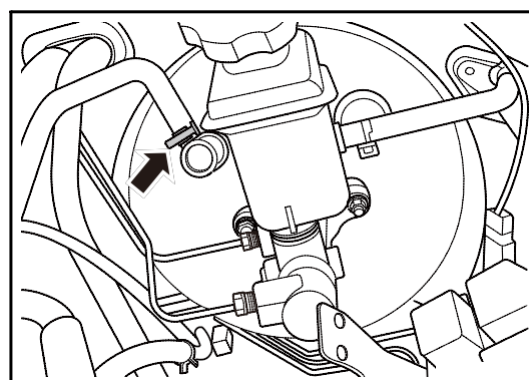
XVI. Vacuum hose assembly

(I) Disassembly

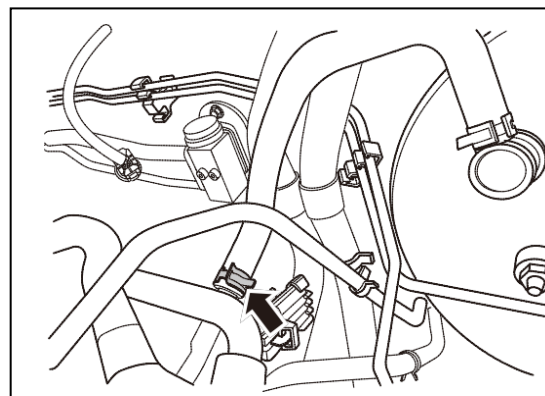
1. Open the engine hood

2. Disassemble the vacuum hose assembly

1). Remove the girdle clamp to disconnect vacuum hose and booster

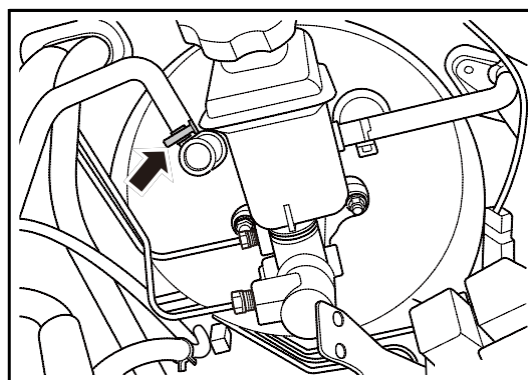


- 2). Remove the girdle clamp to disconnect vacuum hose and vacuum power steel pipe

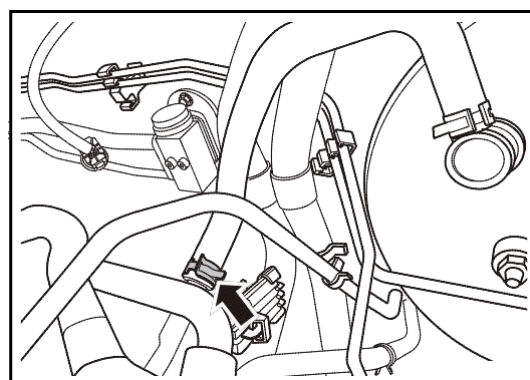


(II) Installation

1. Install the vacuum hose assembly
 - 1). Install the girdle clamp to connect vacuum hose and booster



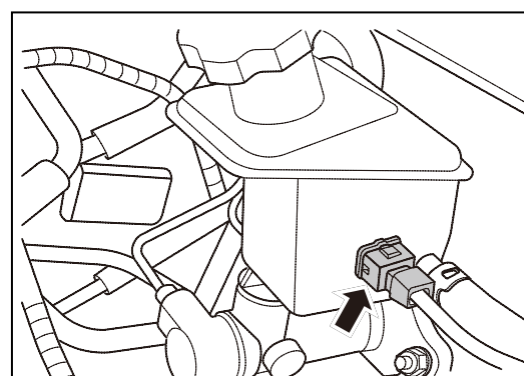
- 2). Install the girdle clamp to connect vacuum hose and power steel pipe
2. Close the engine hood



XVII Liquid sensor of brake fluid

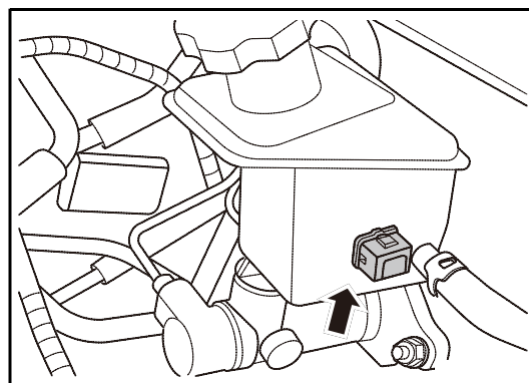
(I) Disassembly

1. Open the engine hood
2. Disconnect the battery's negative cable
3. Remove the liquid sensor
 - 1). Remove the clamp to disconnect sensor's harness connector



2). Take out the sensor from the side face of storage tank

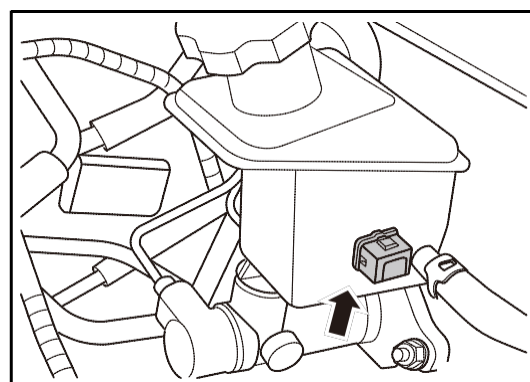
△Notice No need to discharge the brake fluid



(II) Installation

1. Install the liquid sensor of brake fluid

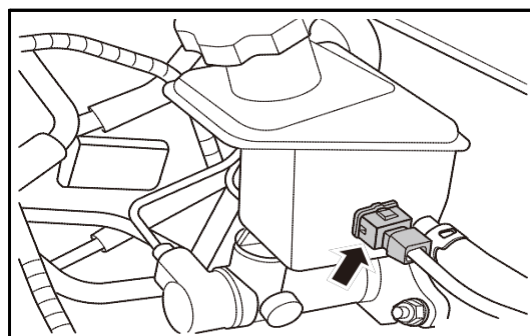
1). Install the sensor into the correct position of the liquid tank



2). Connect the harness connector of sensor

2. Connect the battery's negative cable

3. Close the engine hood



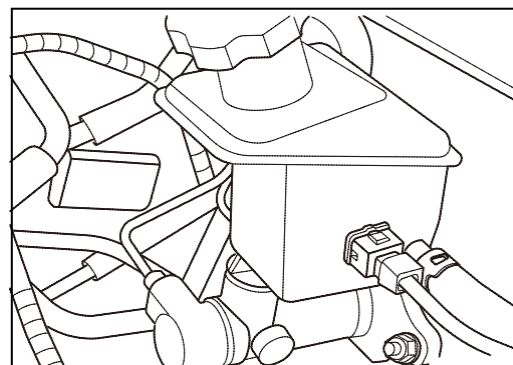
XVIII Air-removal of brake system

(I) System's air-exhaust

△Notice Air cannot be exhausted from hydraulic brake on MT type. If the air is mixed in ABS hydraulic brake, or unfilled ABS hydraulic brake is installed, it is necessary to use fault diagnosis tester to exhaust air from the brake system. The situation of ABS brake when the car goes off-line is filled without air, and air will not enter the ABS brake during normal service process. Under this situation, please use manual air-removal process.

1. Preparation

- 1). Keep the engine shut down, and stamp the brake pedal for several times till no assist power exists.
- 2). Add brake fluid into fluid storage of master cylinder, and ensure the liquid level more than half during air-removal process



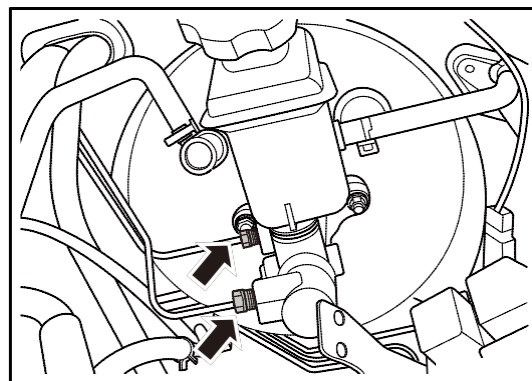
2. Exhaust air from master cylinder

△Notice If the master cylinder is re-installed, or the liquid storage is empty, please exhaust the air from the master cylinder

- 1). Stamp and hold the brake pedal till the end side
- 2). Loosen one brake oil pipe from the master cylinder, and fasten the joint after the brake fluid runs off
- 3). Loosen the other brake oil pipe from the master cylinder, and fasten the joint after the brake fluid runs off

△Notice Cover the painting side with rag to prevent fluid adhesion

- 4). Repeat step 1) to 3) for 3~4 times



3. Exhaust air from brake pipe

- 1). Remove the dust cover of bleeder screw on the brake
- 2). Connect a transparent tube with the bleeder screw on the left-rear brake, and soak

△Notice Exhaust air from brake pipe consecutively from far to near ABS brake

- 3). Stamp the brake pedal slowly for several times till the pedal is on the end side

△Notice Do not stamp the pedal quickly

- 4). Loosen the bleeder screw and exhaust air from brake while holding the brake pedal
- 5). Tighten the bleeder screw and slowly loosen the brake pedal when the brake fluid stops overflowing
- 6). Repeat step 3) to 5) till the air in the brake fluid is completely exhausted

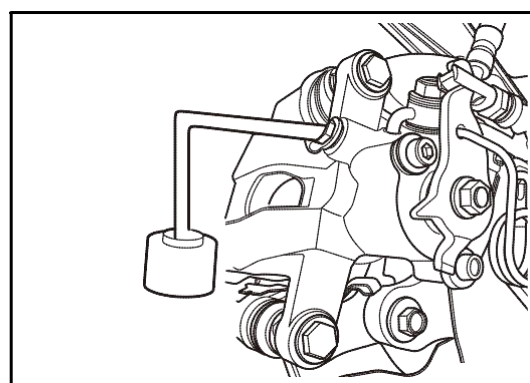
- 7). If no air bubble appears in the tank when loosen the bleeder screw, it means the air is completely exhausted

△Notice ensure the liquid level is more than half during air-removal process

- 8). Tighten the bleeder screw

Tightening torque 7~13N.m

- 9). Exhaust air in other brakes by following step 1) to 8)
- 10). Check whether the brake pedal is stamped softly or not after exhausting air from all brakes. If yes, please

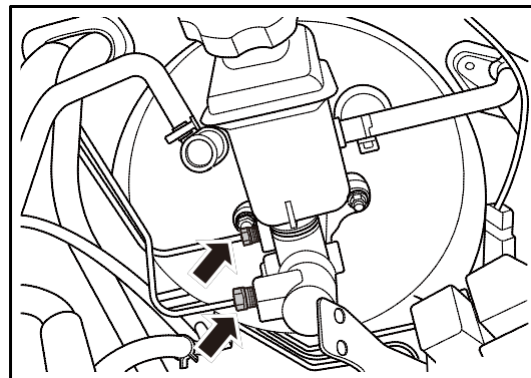


repeat the whole process till it works normally.

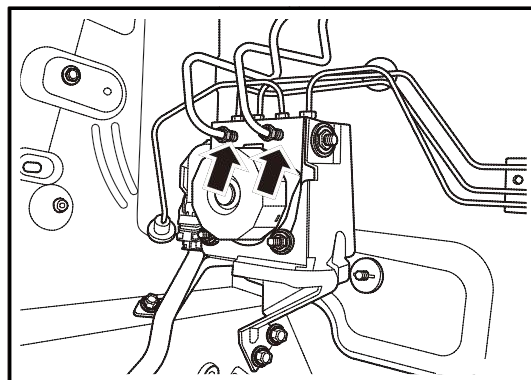
XIX Oil outlet tube of master cylinder

(I) Disassembly

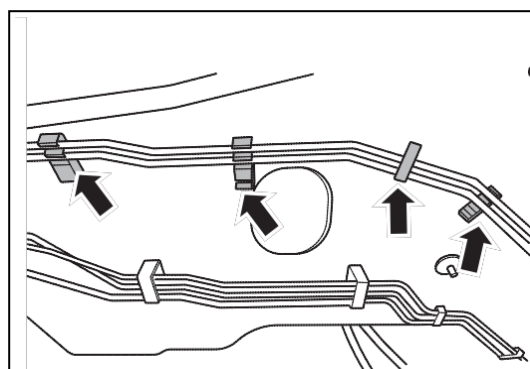
1. Open the engine hood
2. Drain the brake fluid (please refer to “brake fluid”)
3. Remove the assembly of master cylinder’s fuel outlet pipe
 - 1). Loosen the screw on fuel pipe to disconnect pipe assembly and brake master cylinder



- 2). Remove the oil pipe screw to disconnect fuel outlet pipe assembly and ABS/ESP controller

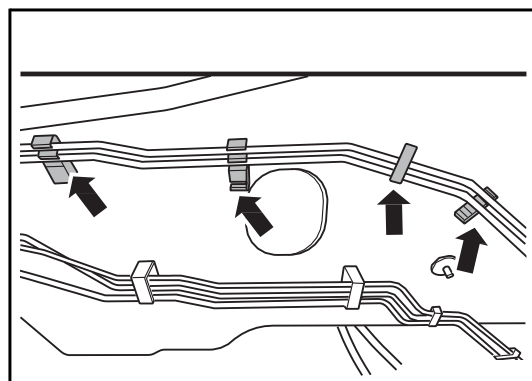


- 3). Loosen the two pipe clamps and 2 front pipe clamps that fix the oil outlet pipe assembly



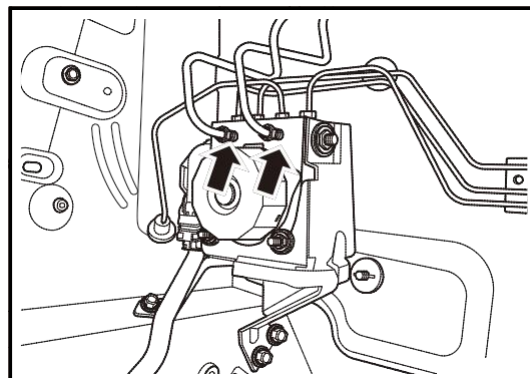
(II) Installation

1. Install the oil outlet pipe assembly
 - 1). Install the assembly on the 2 pipe clamps and 2 front pipe clamps



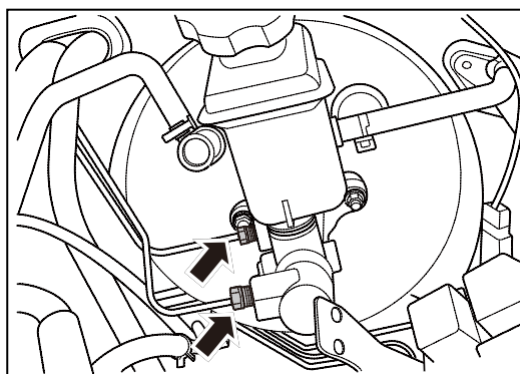
- 2). Install the oil pipe screw to connect the assembly and ABS/ESP controller

Tightening torque: 16~18N.m



- 3). Install oil pipe screw to connect assembly and master cylinder

Tightening torque: 16~18N.m

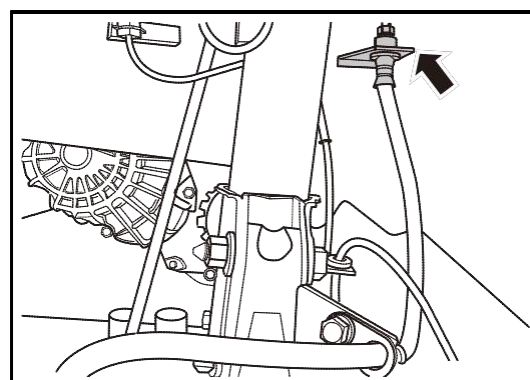


2. Add brake fluid (please refer to “brake fluid”)
3. Exhaust air from brake system (please refer to “air-removal of brake system”)
4. Close the engine hood

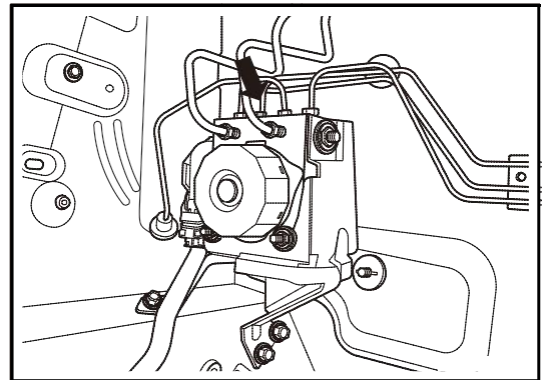
XX Front brake pipe assembly

(I) Disassembly

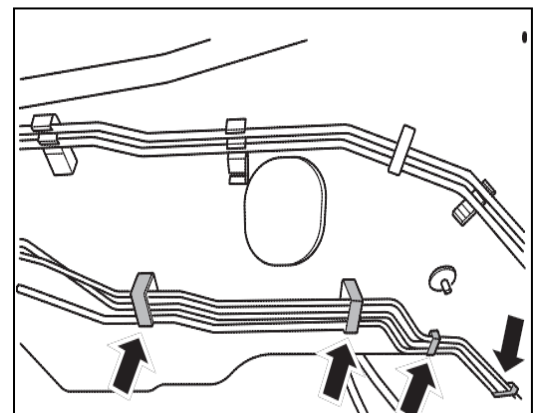
1. Open the engine hood
2. Drain the break fluid (please refer to “brake fluid”)
3. Remove the left-front brake oil pipe assembly
 - 1). Remove the screw that connects left-front brake pipe assembly and brake hose



- 2). Loosen the screw to disconnect left-front brake oil pipe assembly and ABS/ESP controller

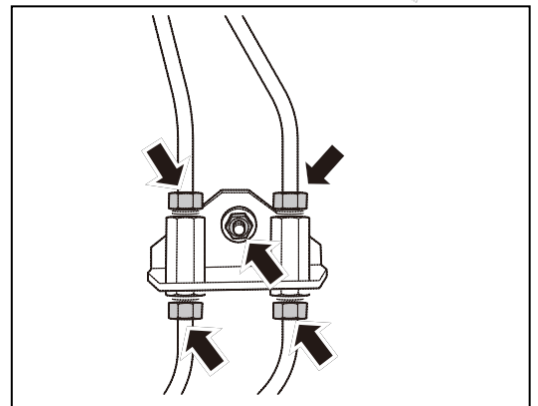


- 3). Unfix the two pipe clamps and two white three-hole clamps that tighten the left-front brake oil pipe
- 4). Detach the left-front brake oil pipe assembly

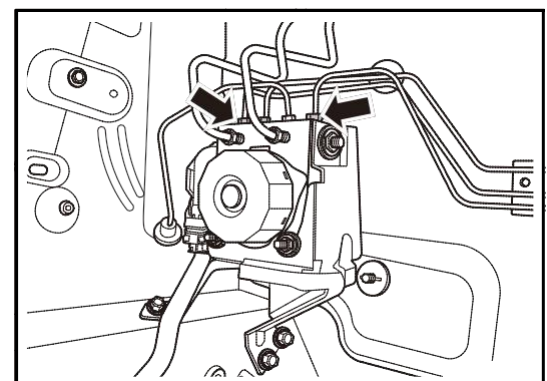


4. Remove the left-rear and right-rear brake pipe assembly

- 1). Remove the oil pipe screw that connects left-rear brake pipe assembly and pipe itself
- 2). Remove the oil pipe screw that connects right-rear brake pipe assembly and pipe itself

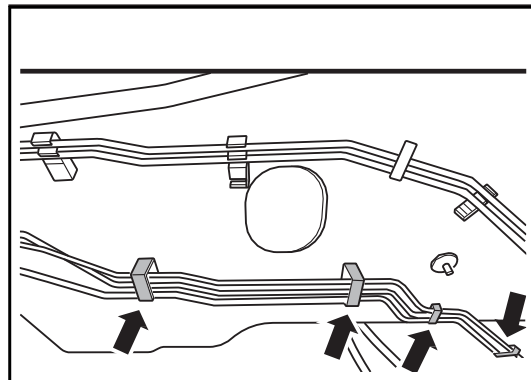


- 3). Remove the oil pipe screw that connects left-rear brake pipe assembly and pipe itself
- 4). Remove the oil pipe screw that connects right-rear brake pipe assembly and pipe itself



5). Unfix the two pipe clamps and two white three-hole clamps that tighten the left-rear and right-rear brake pipe assembly

6). Detach the left-rear and right-rear brake pipe assembly

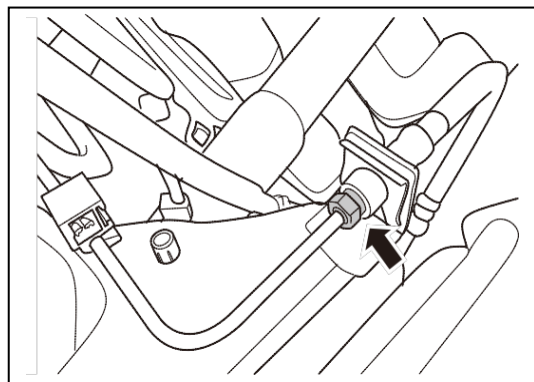


(II) Installation

1. Install the left-front brake oil pipe assembly

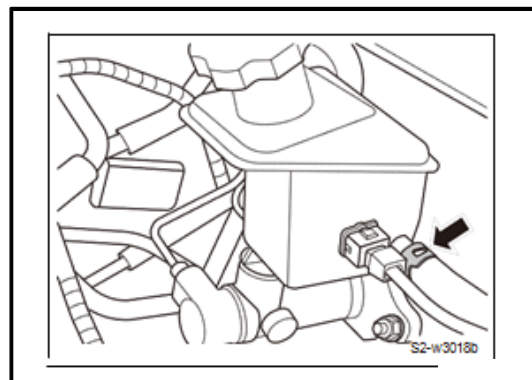
1). Install the screw that connects left-front brake oil pipe and brake hose

Tightening torque: 16~18N m

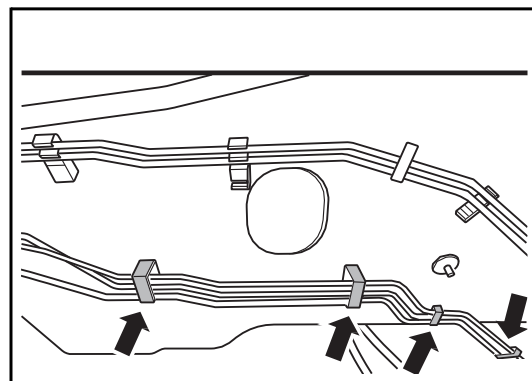


2). Install the screw that connects left-front brake oil pipe and ABS/ESP controller

Tightening torque: 16~18N m



3). Install the left-front brake oil pipe to the two pipe clamps and two front clamps that fix the left-front brake oil pipe assembly



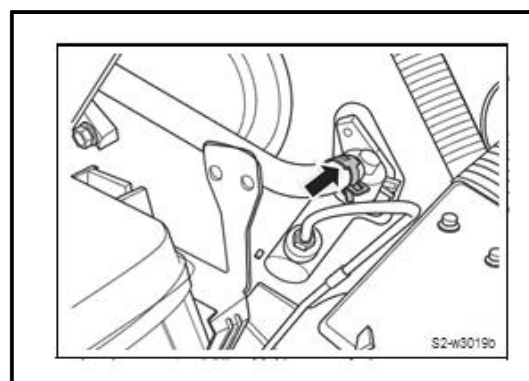
2. Install the left-rear and right-rear brake pipe assembly

1). Tighten the screw that fixes the left-rear brake pipe assembly and ABS/ESP controller

Tightening torque: 16~18N m

2). Tighten the screw that fixes the right-rear brake pipe assembly and ABS/ESP controller

Tightening torque: 16~18N m

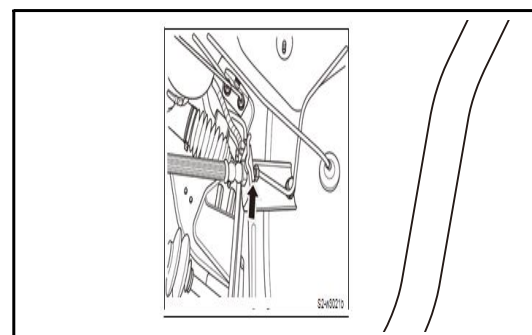


3). Install the screw that connects the left-rear brake pipe assembly and the final part of left-rear brake pipe

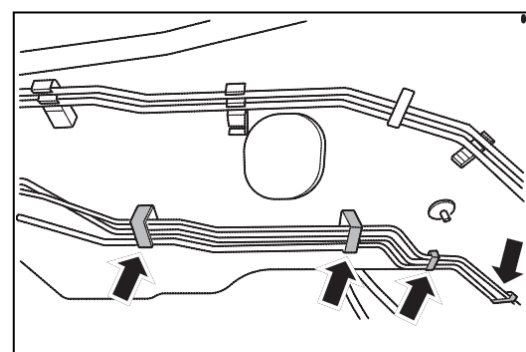
Tightening torque 16~18N.m

4). Install the screw that connects the right-rear brake pipe assembly and the final part of right-rear brake pipe

Tightening torque 16~18N.m



5). Install the left-rear and right-rear brake pipe assembly on the two pipe clamps and two white triple clamps



3. Add brake fluid, please refer to “brake fluid”

4. Exhaust air from brake system, please refer to “Air-removal of brake system”

5. Close the engine hood

XXI Rear brake pipe assembly

(I) Disassembly

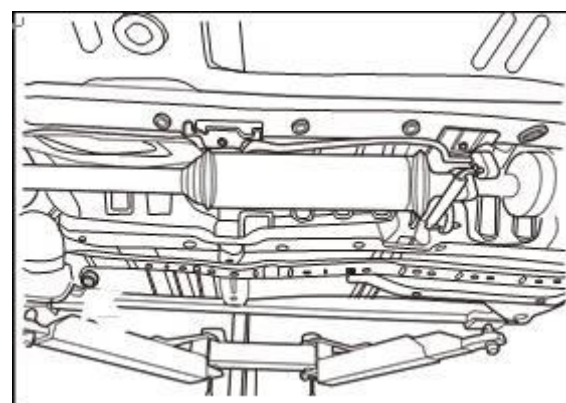
1. Open the engine hood

2. Drain the brake fluid, please refer to “brake fluid”

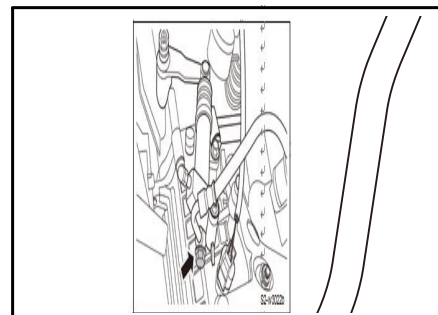
3. Remove the rear wheel, please refer to “wheel”

4. Disassemble the final parts of left-rear and right-rear brake pipe assembly

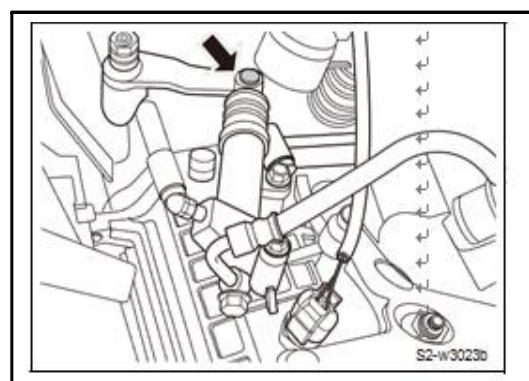
1). Remove the cover-sheet assembly of rear brake pipe assembly



- 2). Loosen the screw that connects left-rear brake pipe and the final part of left-rear brake pipe
- 3). Loosen the screw that connects right-rear brake pipe and the final part of right-rear brake pipe



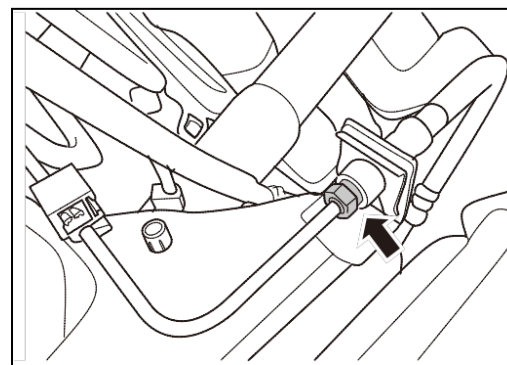
- 4). Loosen the screw that connects final part of left-rear brake pipe assembly and left-rear brake hose
- 5). Loosen the screw that connects final part of right-rear brake pipe assembly and right-rear brake hose



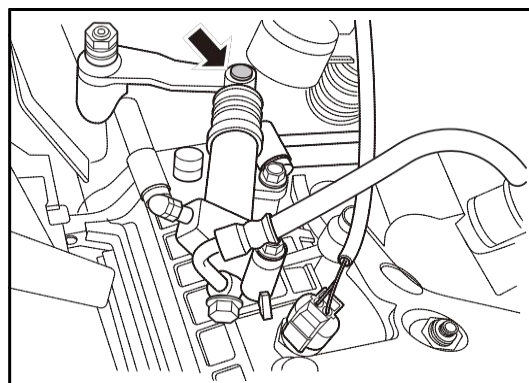
- 6). Dismantle the five pipe clamps and the single pipe clamp that connects final-part of left-rear assembly and car body
- 7). Dismantle the five pipe clamps and three single pipe clamp that connects final-part of right-rear assembly and car body
- 8). Take off the final part of left-rear and right-rear brake pipe assembly

5. Dismantle the assembly of left-rear and right-rear brake pipe

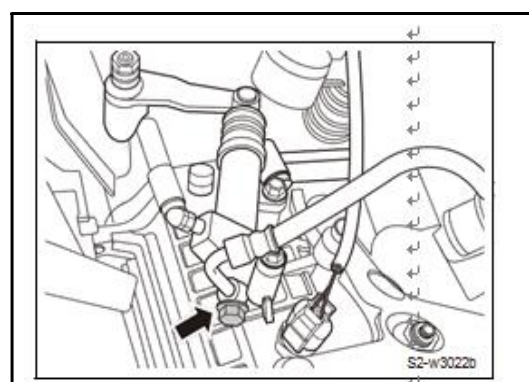
- 1). Loosen the screw that connects left-rear brake pipe assembly and left-rear brake hose II
- 2). Loosen the screw that connects right-rear brake pipe assembly and right-rear brake hose II



- 3). Loosen the screw that connects left-rear brake pipe assembly and left-rear brake hose
- 4). Loosen the screw that connects right-rear brake pipe assembly and right-rear brake hose
- 5). Take off the left-rear and right-rear brake pipe assembly



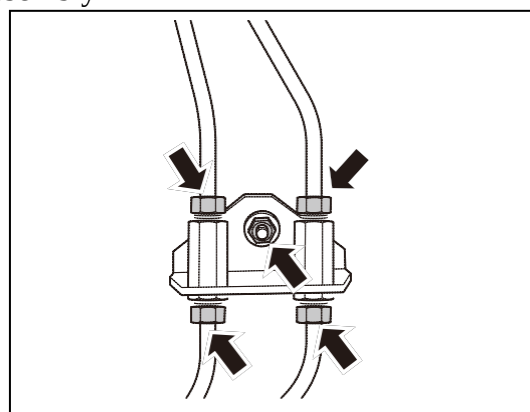
6. Remove the rear brake oil pipe support
 - 1). Loosen the fixed bolt that connects rear brake oil pipe and car body
 - 2). Take off the rear brake oil pipe support



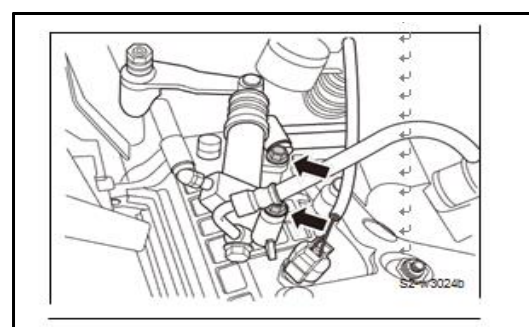
(II) Installation

1. Install the final part of left-rear and right-rear brake pipe assembly

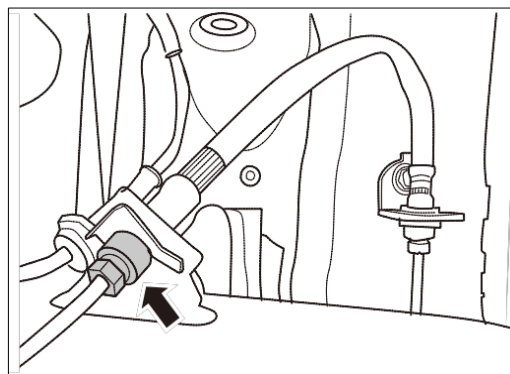
- 1). Tighten the screw that connects left-rear brake pipe assembly and the final part of left-rear brake pipe
Tightening torque 16~18N.m
- 2). Tighten the screw that connects right-rear brake pipe assembly and the final part of right-rear brake pipe
Tightening torque 16~18N.m



- 3). Install the screw that connects the final part of left-rear brake pipe assembly and left-rear brake hose
Tightening torque 16~18N.m
- 4). Install the screw that connects the final part of right-rear brake pipe assembly and right-rear brake hose
Tightening torque 16~18N.m

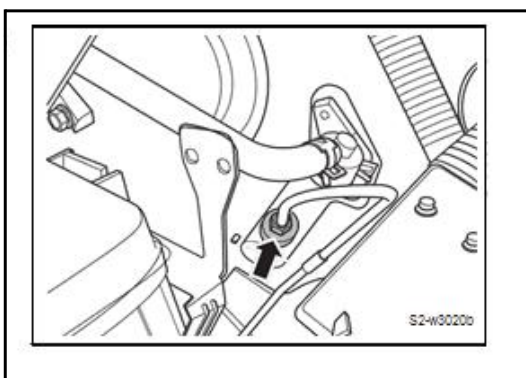
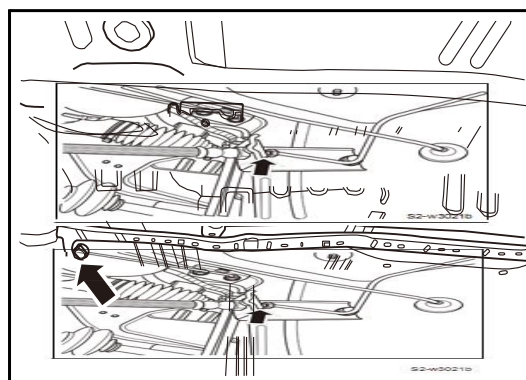


- 5). Install the five pipe clamps and the single pipe clamp that connect the final part of left-rear brake pipe assembly and car body
- 6). Install the five pipe clamps and three single pipe clamps that connect the final part of left-rear pipe assembly and car body
- 7). Install the cover sheet of the final part of rear brake pipe



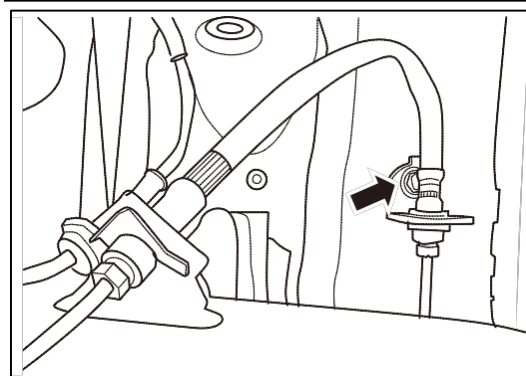
2. Install the assembly of left-rear and right-rear brake pipe

- 1). Install the screw that connects left-rear brake pipe assembly and left-rear brake hose II
Tightening torque 16~18N.m
- 2). Install the screw that connects right-rear brake pipe assembly and right-rear brake hose II
Tightening torque 16~18N.m
- 3). Install the screw that connects left-rear brake pipe assembly and left-rear brake hose
Tightening torque 16~18N.m
- 4). Install the screw that connects right-rear brake pipe assembly and right-rear brake hose
Tightening torque 16~18N.m

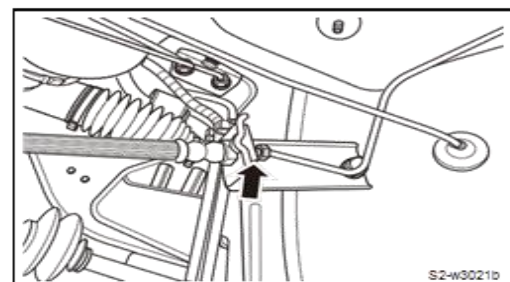


3. Install the rear brake oil pipe support

- 1). Install the two fixed bolts that connect rear brake oil tube support and car body
Tightening torque 20~25N.m



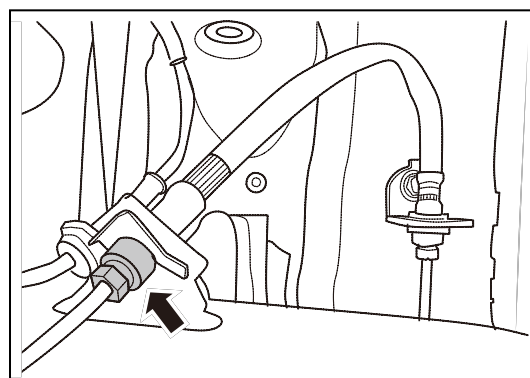
4. Add brake fluid, please refer to “brake fluid”
5. Exhaust air from brake system, please refer to “Air-removal of brake system”
6. Install the rear wheels
7. Close the engine hood



XXII Rear brake hose assembly

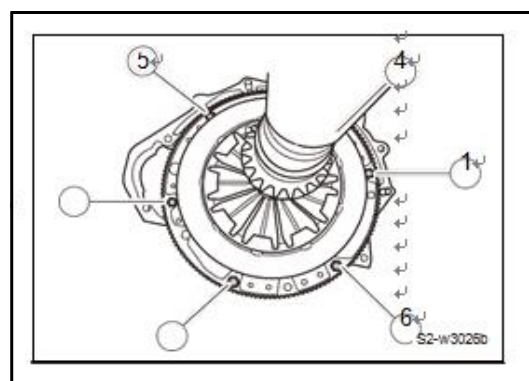
(I) Disassembly

1. Lift the car
2. Drain the brake fluid, please refer to “brake fluid”
3. Dismantle the rear brake hose assembly
 - 1). Remove the screw that connects rear brake hose assembly and the final part of rear brake pipe
 - 2). Remove the screw that connects left-rear brake hose assembly and the left-rear brake pipe assembly
 - 3). Take off the rear brake hose assembly

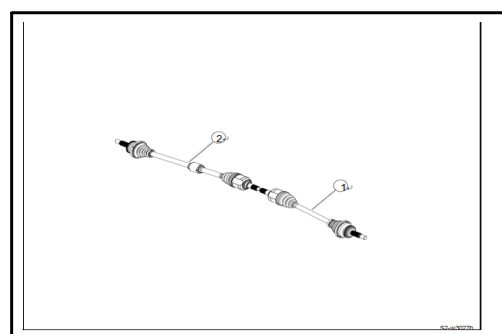


(II) Installation

1. Install the rear brake hose assembly
 - 1). Install the screw that connects left-rear brake hose assembly and the final part of left-rear brake pipe
Tightening torque 16~18N.m



- 2). Install the screw that connects left-rear brake hose assembly and the left-rear brake pipe assembly
Tightening torque 16~18N.m

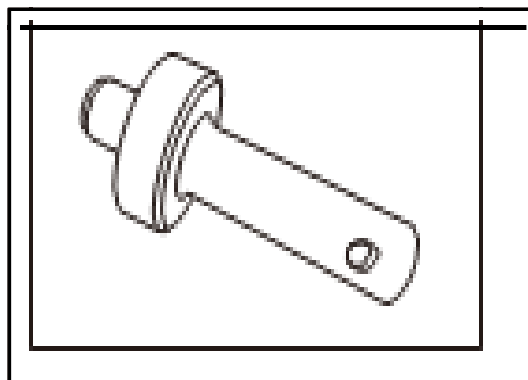
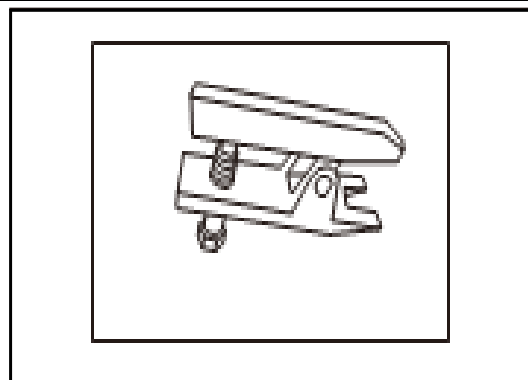


2. Add brake fluid, please refer to “brake fluid”
3. Exhaust air from brake system, please refer to “Air-removal of brake system”
4. Lift down the car

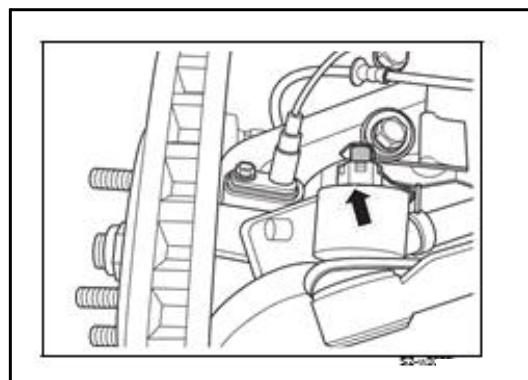
XXIII Right-front brake oil pipe assembly

(I) Disassembly

1. Open the engine hood
2. Drain the brake fluid, please refer to “brake fluid”
3. Dismantle the right-front oil pipe assembly
 - 1). Loosen the screw that connects right-front brake oil pipe assembly and right-front brake hose



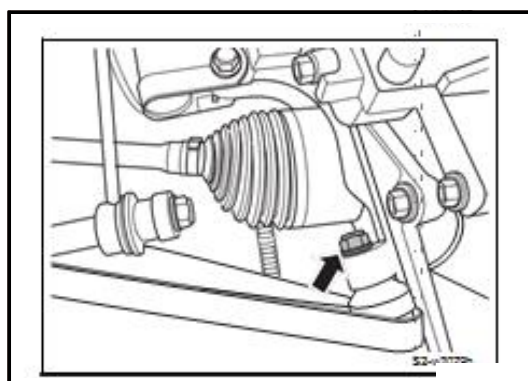
- 2). Loosen the screw that connects right-front brake oil pipe assembly and ABS/ESP controller
- 3). Take off the right-front brake oil pipe assembly



(II) Installation

1. Install right-front brake oil pipe assembly
 - 1). Tighten the screw that connects right-front brake oil pipe and right-front brake hose

Tightening torque 16~18N.m



2). Tighten the screw that connects right-front brake oil pipe and ABS/ESP controller

Tightening torque 16~18N.m

2. Add brake fluid, please refer to “brake fluid”

3. Exhaust air from brake system, please refer to “Air-removal of brake system”

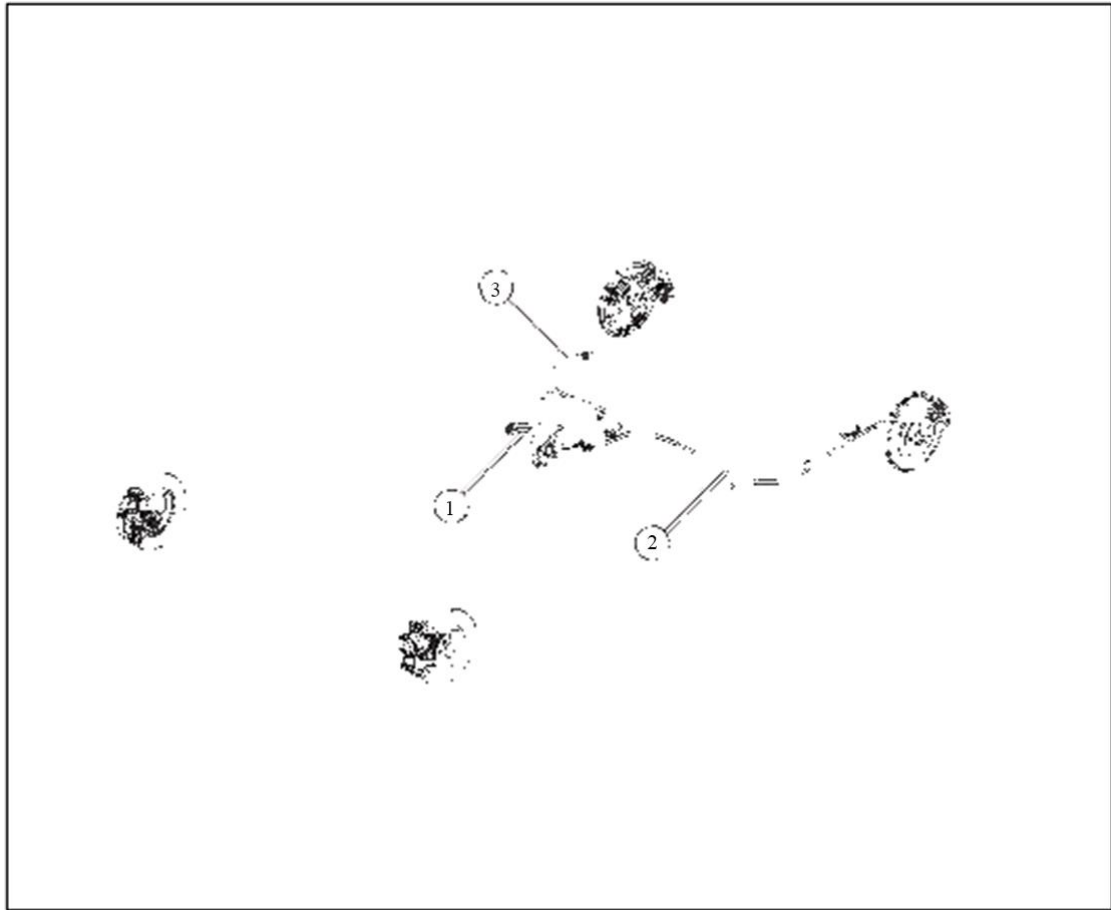
4. Close the engine hood

Parking Brake System

I General introduction

(I) Brief introduction of structure

Structure diagram of parking brake system



1. Parking brake handle assembly
2. Fibre-drawing assembly of left-parking brake
3. Fibre-drawing assembly of right-parking brake
- (II) Maintenance parameter

	Project	Specification
Rear parking brake	Type	Drum
	Diameter of wheel cylinder	17.46mm
	Diameter of brake drum	204mm
	Thickness of frictional pad	4mm
	Type	Floating caliper/Ventilated disc
	Disc diameter	275mm
	Disc thickness	9mm
	Thickness of frictional pad	8mm
	Cylinder diameter	34mm

(III) Torque parameter

No.	Project	Torque (N.m)	Remark
1	Fixed bolt of parking brake handle	20~25	
2	Fixing screw of parking brake	6~8	
3	Nut and bolt of fixing support for	7~11	

II Failure diagnosis

(I) Chart of failure and diagnosis

No.	Failure	Diagnosis	Solution	Remark
1	Indicator lamp keeps lighting or doesn't work	Check whether the indicator lamp on dashboard is broken	Change the indicator lamp on dashboard	
		Check whether the bolt between the switch and tooth plate is fixed	Adjustment	
2	Brake delay	The parking is not released totally	Release the parking brake	
		Improper adjustment on parking brake	Adjustment	
3	Insufficient parking brake force	Rear brake shoes are broke	Adjustment	
		Lubricating grease or oil exists on the surface of rear brake shoes	Change the brake shoes	
		The fibre-drawing of parking brake is stuck	Adjustment	
		Malfunction appears in self-adjustment mechanism	Adjustment	
		Excessive distance for parking brake handle	Adjustment	
4	Parking brake fails	Fibre-drawing or sleeve corrodes Stiff spring is broken, brake off or loses elasticity	Check whether the fibre-drawing or spare parts for braking system are broken; Check whether the handle works smoothly without delay; Check the connector and fixed part of fibre-drawing is loosen or broken, and repair&change these parts if necessary	

III Check and adjustment on the assembly of parking brake system

(I) In-car check

△Notice Check and adjust parking brake system only when the brake works normally

△Notice While checking parking brake system, the car must be parked on even ground, with wheels being fixed by wedges

Check spare parts

1. Check whether all spare parts are fixed normally
2. Check whether the brake handle is crooked, broken or has cracks, and change the handle if necessary
3. Check whether the fibre-drawings are worn or broken, and change them if necessary
4. Check whether the indicator lamp switch works normally, and repair&change the lamp if it doesn't work
5. Dismantle the switch connector of parking brake, and check the continuity between positive terminal and car body. The circuit should be on when the handle is pulled up, and off when the handle is pulled down

Check the working distance of parking brake

1. Pull up the parking brake, and confirm that when the handle is pulled up, the number of teeth that the handle passed stays in standard

Standard teeth number: 7~9

△Notice there will be a tick every time when the handle passes a tooth, by counting the tick, you can judge whether the brake handle works in standard when pulled up

Adjust the working distance of parking brake

1. Open the engine hood
2. Dismantle the vice dashboard, please refer to “vice dashboard”
3. Adjust the working distance of parking brake handle
 - 1). Adjust the adjusting nut on the parking brake system, and ensure the distance (L) between the adjusting nut and the final part of fibre-drawing stays in standard

Standard: L=20~25mm

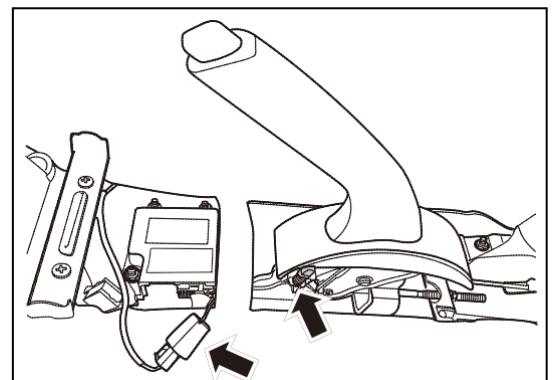
Standard teeth number: 7~9

△Notice Decrease L if the number of passed teeth is less than 7, and increase L if the number of passed teeth is more than 9

4. Pull down the parking brake
5. Check whether the rear wheels are delayed when parking

IV Parking brake switch**(I) Disassembly**

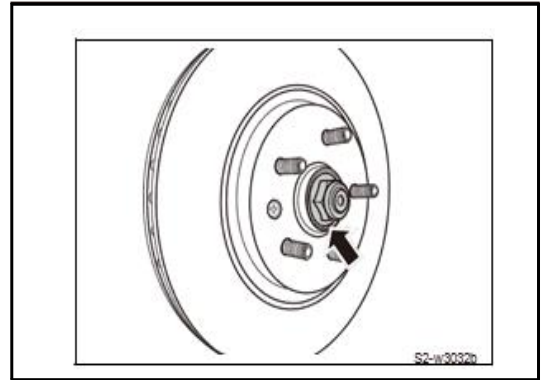
1. Open the engine hood
2. Disconnect the negative cable of battery
3. Dismantle the vice dashboard, please refer to “vice dashboard”



4. Remove the parking brake switch
 - 1). Pull down the parking brake handle
 - 2). Disconnect the harness connector of parking brake lamp
 - 3). Loosen the fixed bolt of parking brake switch and take off the switch

(II) Installation

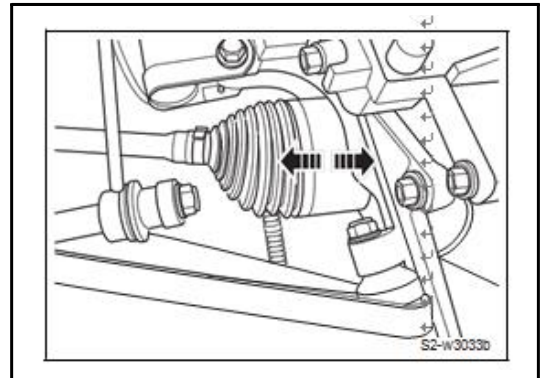
1. Install the parking brake switch
 - 1). Install the fixed bolt of parking brake switch
Tightening torque 6~8N.m
 - 2). Connect the harness connector of parking brake switch
2. Install the vice dashboard
3. Connect the negative cable of battery
4. Close the engine hood



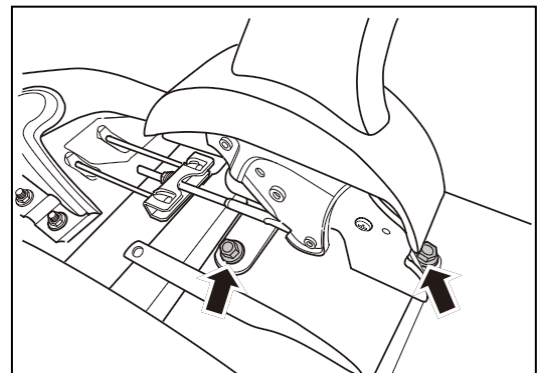
V Parking brake system assembly

(I) Disassembly

1. Open the engine hood
2. Disconnect the negative cable of battery
3. Dismantle the vice dashboard, please refer to “vice dashboard”
4. Disassemble the parking brake switch, please refer to “parking brake switch”
5. Disassemble the parking brake system assembly
 - 1). Loosen the nut on the adjusting sprial

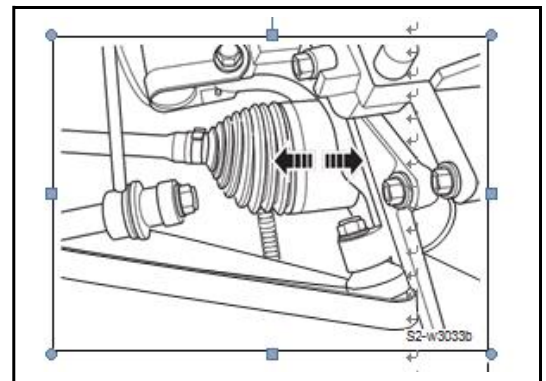
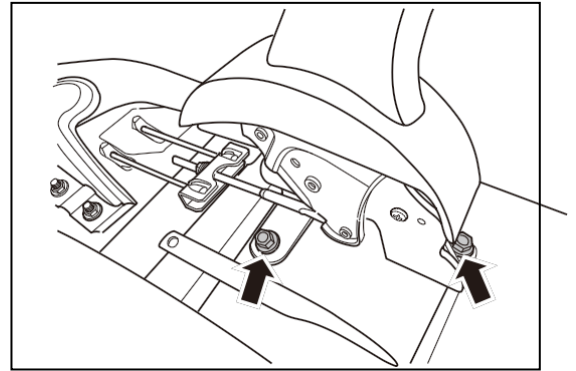


- 2). Loosen the two fixed bolts that connect parking brake system assembly and car body
- 3). Disconnect fibre-drawing from balance bar
- 4). Take off the parking brake system



(II) Installation

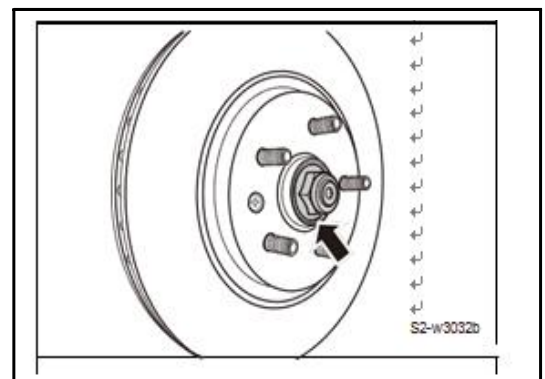
1. Install the parking brake system assembly
 - 1). Tighten the two fixing bolts that connect parking brake system assembly and car body
Tightening torque 20~25N.m
 - 2). Adjust the nut into a proper position on the final part of threaded rod, and install the fibre-drawing on the balance bar
2. Check and adjust the parking brake system assembly, please refer to “Check and adjustment on the assembly of parking brake system”
3. Install the parking brake switch
4. Install the vice dashboard
5. Connect the negative cable of battery
6. Close the engine hood



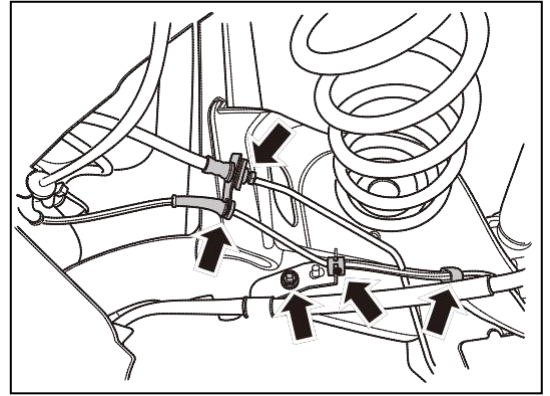
VI Parking brake fibre-drawing assembly

(I) Disassembly

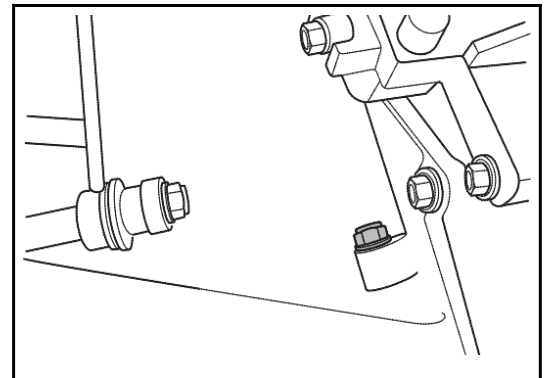
1. Open the engine hood
2. Disconnect the negative cable of battery
3. Dismantle the vice dashboard, please refer to “Vice dashboard”
4. Disassemble the parking brake system assembly, please refer to “Parking brake system assembly”
5. Remove the rear wheels, please refer to “Wheel”
6. Disassemble the rear brake caliper, please refer to “Front brake caliper assembly”
7. Remove thermal baffle I and II, please refer to “Thermal baffle”
8. Disassemble the parking brake fibre-drawing assembly
 - 1). Adjust the nut on the final part of threaded rod
 - 2). Disconnect the left-rear and right-rear parking brake fibre-drawing from balance plate



3). Remove the bolts and nuts on the fixing support

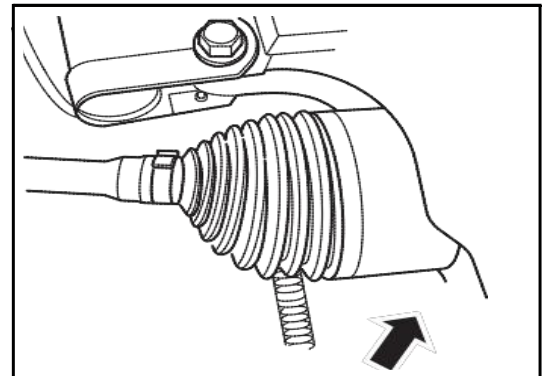


4). Take out the fibre-drawing from the mounting sleeves that locate in the bottom of the car



5). Disconnect the parking brake fibre-drawing and parking brake disc

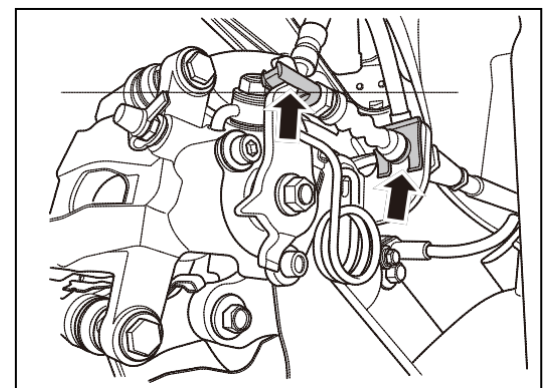
6). Take off the parking brake fibre-drawing assembly



(II) Installation

1. Install the parking brake fibre-drawing

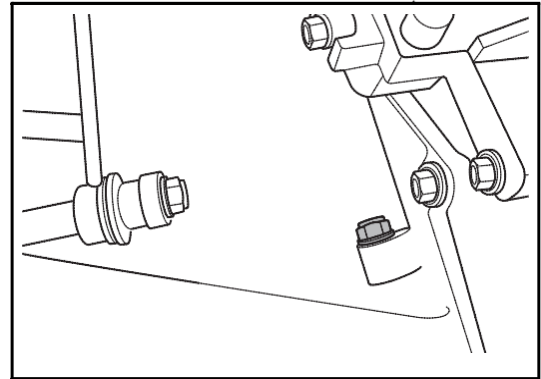
1). Connect the parking brake fibre-drawing and parking brake disc



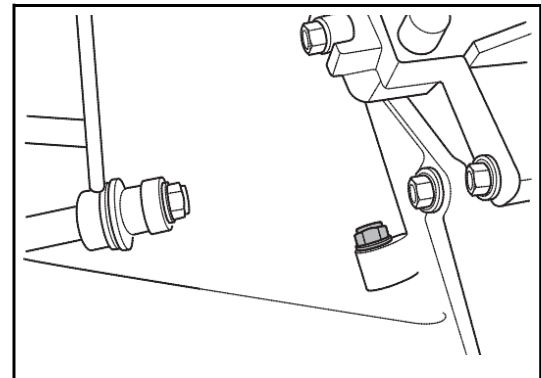
2). Tighten the bolts and nuts on the fixing support of parking brake fibre-drawing

Tightening torque 7~11N.m

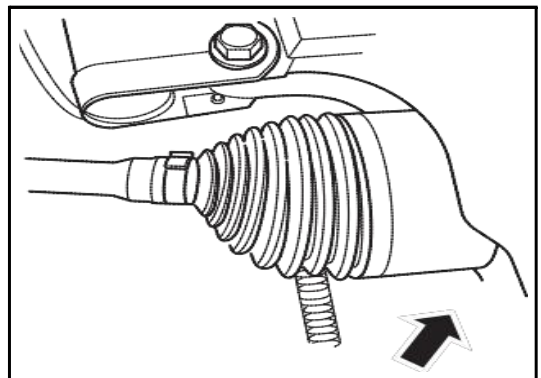
△Notice the route of fibre-drawings should be smooth



3). Install the fibre-drawings into the mounting sleeves that locate on the bottom of the car.



4). Install the left-rear and right-rear parking brake fibre-drawings on the balance plate



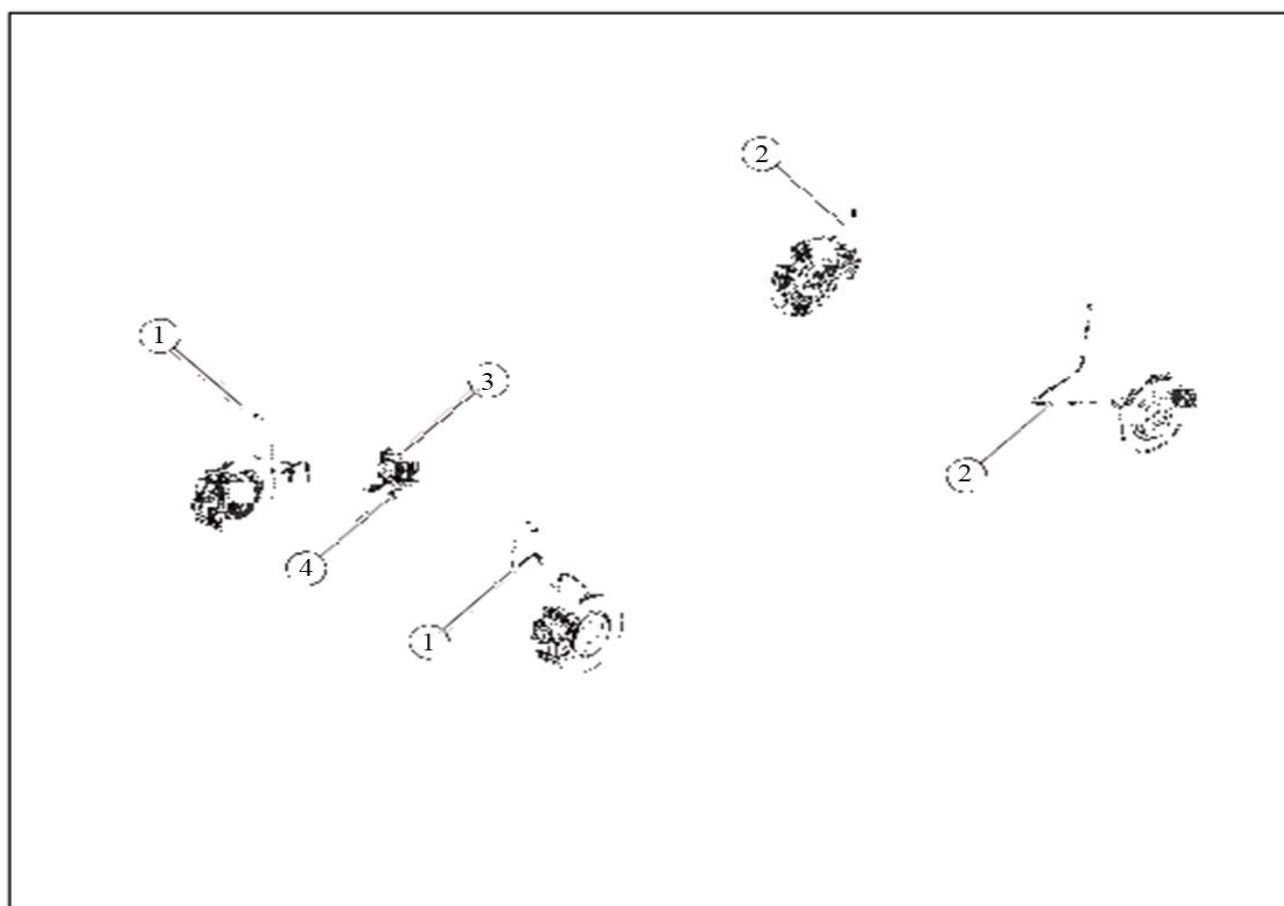
2. Check and adjust the parking brake system assembly, please refer to “Check and adjustment on the assembly of parking brake system”
3. Install the vice dashboard
4. Install the rear brake caliper assembly
5. Install the rear wheels
6. Install the thermal baffle I and II
7. Connect the negative cable of battery
8. Close the engine hood

Brake Control System

I General introduction

(I) Brief introduction on structure

Structural diagram of brake system (front & rear braking disc model)



1. Front wheel's ABS speed sensor assembly

2. Rear wheel's ABS speed sensor assembly

3. ESP controller assembly

4. ESP controller's fixing support

(II) System function

1. ABS

ABS (anti-skid brake system) can control the hydraulic brake force on wheels during emergency braking or braking when the road situation is dangerous, and prevent wheels from skidding. ABS has the following advantages:

(1) Steering will be reliable when facing obstacles during emergency braking

(2) The vehicle can stop steadily on curve roads during emergency braking

2. ESP

ESP (electronic stability program) is an active safety system. It is a dependent system based on other

driving control system. ESP includes all functions of ABS, and increases TCS (traction control system). Meanwhile, additional functions can be applied on it by adding sensors and input signals.

Basic functions:

ABS (anti-skid brake system)

EBD (electric brake force distribution)

AYC (active yawing control)

TCS (traction control system)

Braking assistance:

HBA (hydraulic braking assistance)

Static control system:

HAS (hill-start assist system)

ESP can judge the working conditions of vehicles by analyzing signals provided by steering sensor, wheel sensor, yawing sensor, transverse acceleration sensor and etc. After analysis, it sends rectifying signals to ABS and ASR, so as to help the vehicle to maintain mobile balance and achieve utmost stability under various situations. Its performance will be more apparent when the steering process is excessive or insufficient.

3. EBD

Each wheel's adhesion coefficient provided by ground will be different as the situation of road to which the wheel sticks will be different. What's more, the vehicle's barycenter will change during emergency brake, which may lead to vehicle's skid, bias or roll-over. During the moment of emergency brake, EBD can instantly figure out the friction's numerical difference due to wheels' different adhesion coefficients. Then it adjusts the electromagnetic valves in hydraulic units, so they can adjust themselves instantly during dynamic situation. It can achieve the match of break force and friction, and ensure the vehicle's stability and safety. During emergency brake, EBD will balance each wheel's valid traction before ABS, and prevents the vehicle from whipping or side-swing. Generally speaking, EBD is an additional function of ABS. it can distribute brake force automatically according to the changes of road situation and carrying capacity, and improve ABS's performance.

EBD can control each wheel's break force precisely and ensure the vehicle's stability. On normal breaking situation, it can effectively equal each wheel's speed. By controlling the input & output oil valves of hydraulic adjustment module in ABS, EBD can control each wheel's breaking pressure in order to provide effective breaking and stability for vehicles.

4. TCS

TCS can monitor the slippage rate of driving wheels. If the rate is too big, TCS will send signals to engine, decreasing the amount of fuel injected by nozzle, or the opening of throttle valve, thus decreasing the torque output, and optimizing the drive wheel's slippage rate, which promises drive wheels with bigger adhesion force. If the difference between the drive wheels' adhesion coefficients is too large, TCS will actively impose break force to the drive wheel which has low coefficient, prevent the wheel from skidding, and ensure the drive wheel which has larger coefficient to gain bigger drive force.

5. Failure protection

If electric failure happens in ABS or ESP, the warning light of ABS or ESP will automatically turn on. If electric failure happens in EBD, the brake warning light and ABS warning light will turn on. Meanwhile, ABS will change into one of the following failure protection:

- 1) For ABS's failure, only EBD will be activated, and the

vehicle's condition will be the same as the one without ABS.

2) For EBD's failure, neither EBD nor ABS will be available, and the vehicle's condition will be the same as the one without ABS or EBD.

(III) Working principle

Diagram of ABS's hydraulic working principle

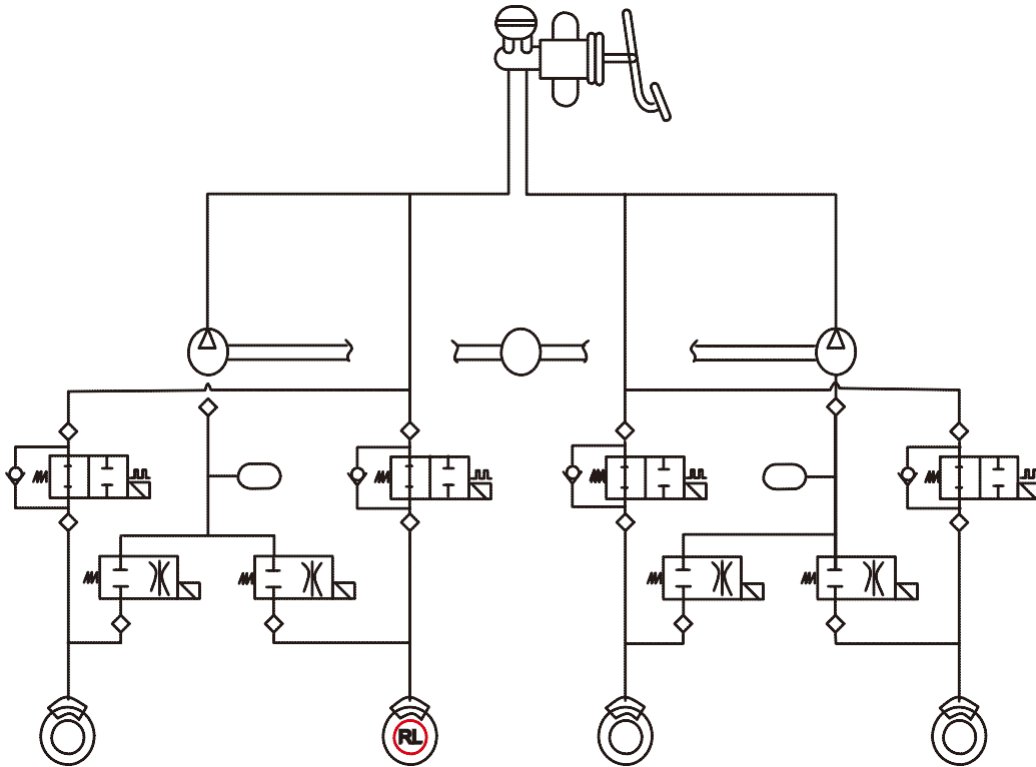


Diagram of ABS

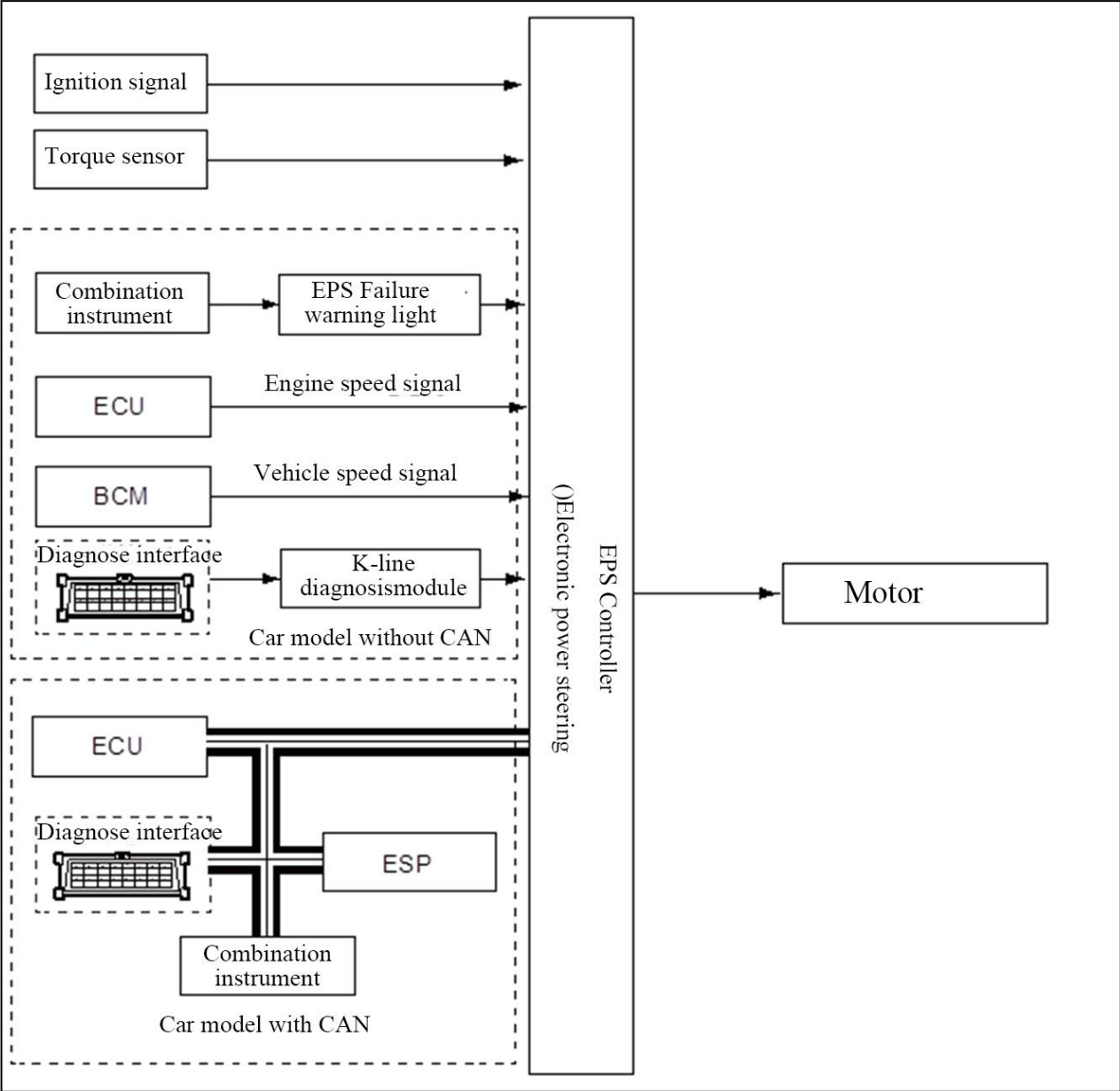
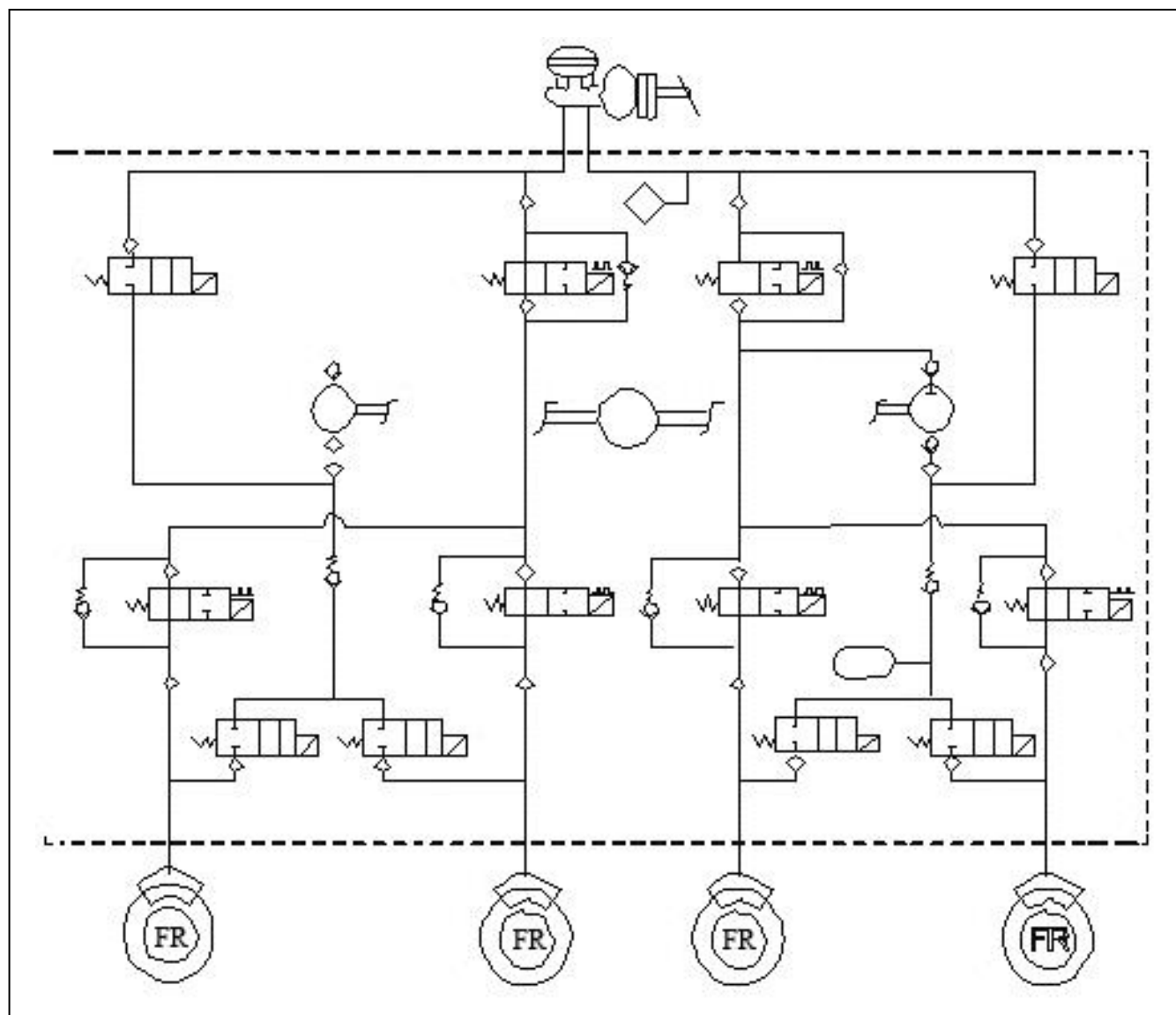


Diagram of ESP's hydraulic working principle



Anti-skid brake mode

During vehicle's brake, should the wheels skid, ABS will be activated into anti-skid brake mode. During this period, all wheels' hydraulic pressure will be under control in case of slippage. Each wheel has its own hydraulic pipeline and valve. ABS can change, or maintain each wheel's hydraulic pressure during vehicle's brake. However, ABS cannot increase the hydraulic pressure to the amount which the master cylinder transfers during brake. Thus, during anti-skid brake, the brake pedal will vibrate quickly. The vibration is triggered by the quick changes of each valve's position. This kind of vibration will appear during anti-skid brake mode, and stop during normal brake or when the vehicle completely stops. As the electromagnetic valve circulates quickly, there will be some noise. If the anti-skid mode is activated when the vehicle is on dry roads, harsh noise will appear intermittently when the wheels are close to slippage. All these noise and vibration are normal circumstances during anti-skid brake. When you stamp the pedal during normal brake, the operation should be the same when you drive the one without ABS. Keeping the power balance during stamping pedal can promise shortest braking distance while maintaining the vehicle's stability.

During anti-skid brake period, the brake system's pressure adjustment can be divided into three phases.

1. Pressure maintenance

When the slippage was detected by ABS control module, it will close oil inlet valve, and close the oil outlet valve in hydraulic assembly to isolate the system. This will maintain the pressure stability of arrester and keep the hydraulic pressure still.

2. Pressure reduction

Should slippage still was detected by ABS control mode under pressure maintenance mode, ABS will reduce the pressure of the wheel which was affected. It will close oil inlet valve, and open oil outlet valve. Redundant fluid or pressure will be stored temporally in the power accumulator of hydraulic assembly until when the pump motor sends the brake fluid back to the reservoir of master cylinder

3. Pressure increase

If ABS control module detects that the wheel slippage has reduced under pressure maintenance or reduction mode, the module will use the pressure of cylinder to increase the affected wheel's pressure. The oil inlet valve will open, and the oil outlet valve will be closed. Part or all pressure from brake system's master cylinder will be added to wheels.

The working process of ABS

When the vehicle is moving, each wheel speed sensor will produce an voltage signal which is proportional to the wheel's rotational speed. ABS controller will receive the speed data and determine whether one or more wheels' speed reduction is too fast, and activate control module if needs. The module will control and optimize each wheel's brake pressure.

II ABS&ESP control module

(I) Components

The front-disc-rear-drum model applies BOSCH ABS 9, with ABS control module and hydraulic assembly being integrated together; the front-disc-rear-disc model applies BOSCH ESP 9, with ESP control module and hydraulic assembly being integrated together.

(II) Illustration of the stitch on ABS, ESP control module

Illustration of stitch in ABS control module

Stitch	Illustration	Stitch	Illustration
1	Motor's battery terminal (positive)	2	Speed sensor output (right-front wheel)
3	Active EBD warning light	4	Speed sensor's signal terminal (right-
5	N.C.	6	K line
7	N.C.	8	Speed sensor's signal terminal (left-
9	N.C.	10	N.C.
11	N.C.	12	N.C.
13	Motor's searh terminal	14	CAN-low
15	N.C.	16	Speed sensor's power terminal (right-
17	Speed sensor's power terminal (right-	18	Speed sensor's signal terminal (left-
19	Speed sensor's power terminal (left-	20	N.C.
21	N.C.	22	N.C.

23	N.C.	24	N.C.
25	Valve relay's power terminal	26	CAN-high
27	Active ABS warning light	28	ECU's power terminal (ignition cable)
29	Speed sensor's signal terminal (right-	30	Brake light switch input
31	Speed sensor's signal terminal (left-	32	N.C.
33	Speed signal output	34	N.C.
35	N.C.	36	N.C.
37	N.C.	38	ECU's earth wire

Diagram of the stitch's position in ABS control module

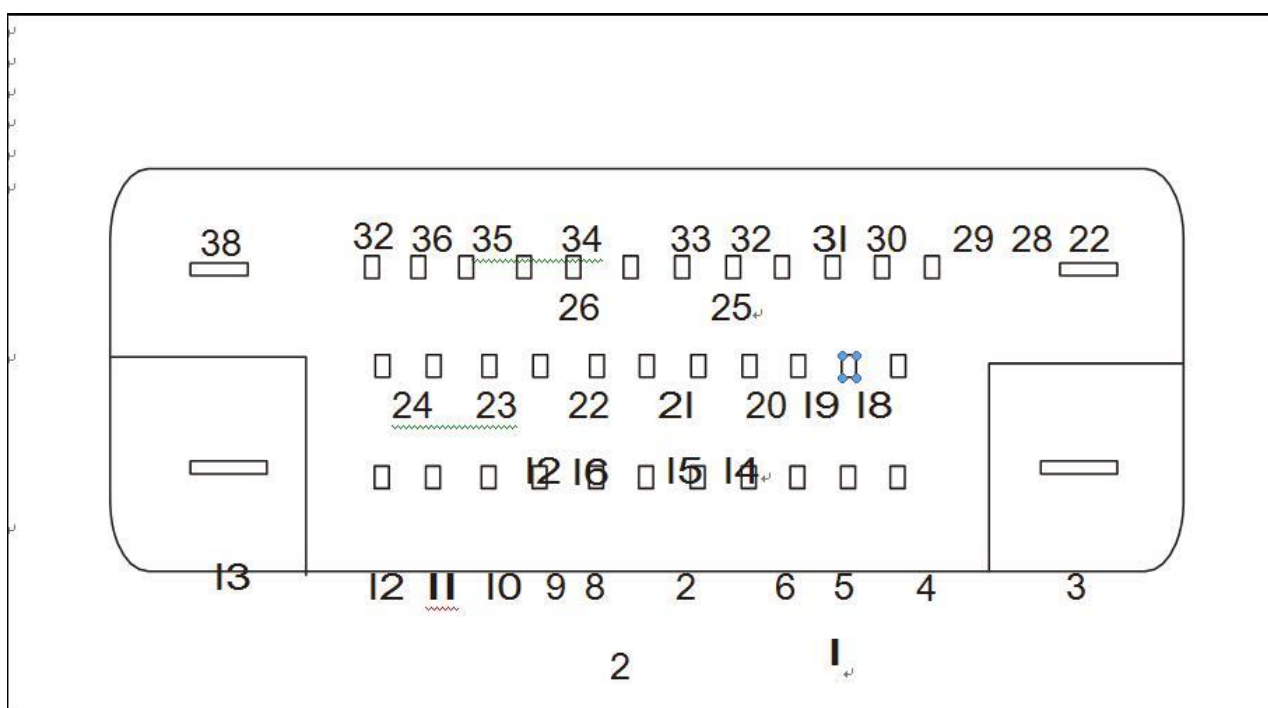
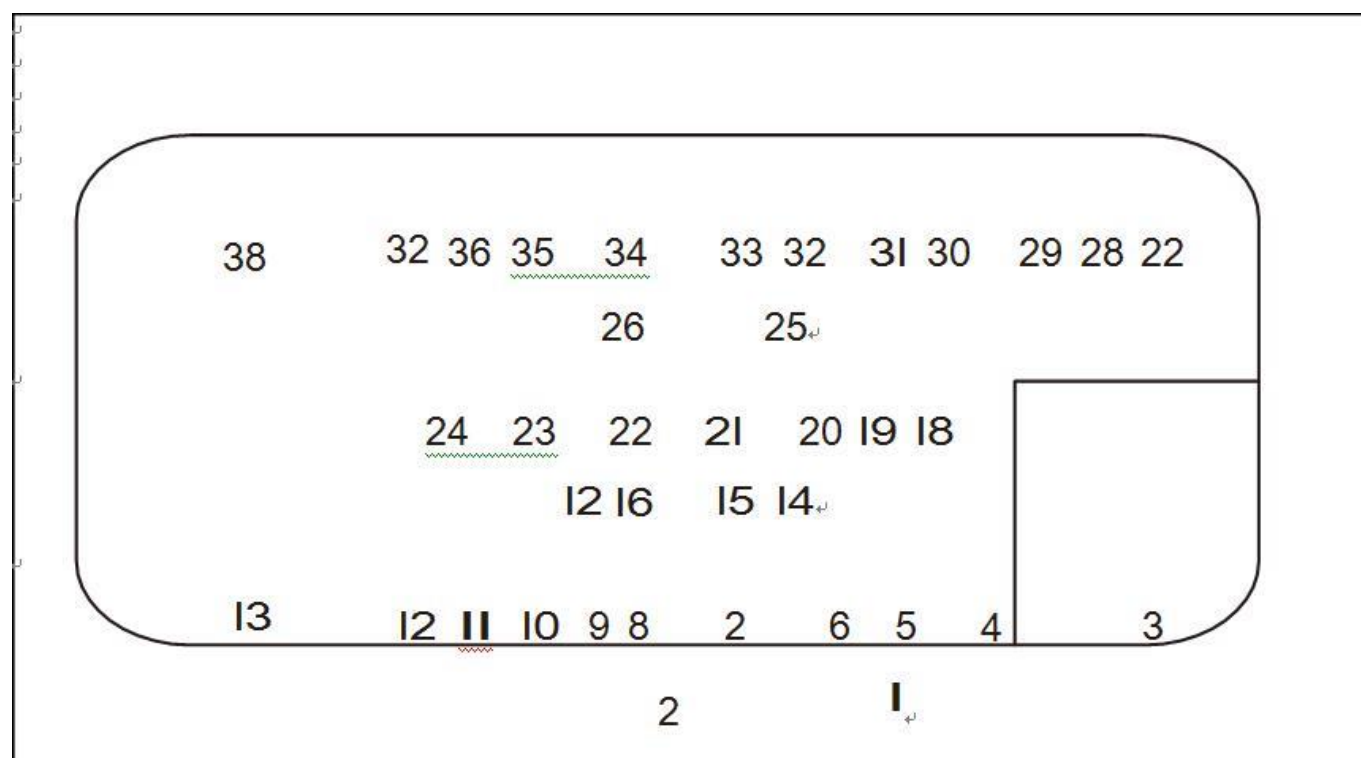


Illustration of stitch in ESP control module

Stitch	Illustration	Stitch	Illustration
1	Motor's battery terminal (positive)	2	Speed sensor output (right-front wheel)
3	N.C.	4	Speed sensor's signal terminal (right-
5	N.C.	6	N.C.
7	N.C.	8	Speed sensor's signal terminal (left-
9	N.C.	10	N.C.
11	N.C.	12	ESP switch
13	Motor's earth terminal	14	CAN- low
15	N.C.	16	Speed sensor's power terminal (right-
17	Speed sensor's power terminal (right-	18	Speed sensor's signal terminal (left-

19	Speed sensor's power terminal (left-	20	N.C.
21	N.C.	22	N.C.
23	N.C.	24	N.C.
25	Valve relay's power terminal	26	CAN- high
27	N.C.	28	ECU's power terminal (ignition cable)
29	Speed sensor's signal terminal (right-	30	Brake light switch input
31	Speed sensor's power terminal (left-	32	N.C.
33	N.C.	34	N.C.
35	N.C.	36	N.C.
37	N.C.	38	ECU's earth wire

Diagram of the stitch's position in ESP control module



(III) Check on ABS&ESP control module

△Notice please go on basic check on brake system first

Basic check on brake system

1. Check the liquid level of brake fluid, and add brake fluid if necessary
2. Check whether any leakage exists in brake pipeline or ABS hydraulic assembly. Should the leakage exists, please make the following checks:
 - a: If the connector part of ABS hydraulic assembly is loosen, please tighten the tubing nut to the designated torque (16~18N.m), check the leakage situation again, and make sure no brake fluid leaks.

- b: If the connector part's tubing nut or the actuator's whorl part is broken, please replace the broken parts and check the leakage again. Make sure no brake fluid leaks.
- c: If no leakage exists except in actuator's connector part, use clean rags to wipe the stain and check again. Should the leakage still exist, please replace the broken part.
- d: If the leakage exists on hydraulic assembly, use clean rags to wipe the stain and check again. Should the leakage still exist, please replace the hydraulic assembly.

△Notice do not disassemble ABS or ESP hydraulic assembly unless with special needs.

3. Check whether the filler block or the shoe plate is broken.
4. Check whether the circuit terminal or the battery is loose.

△Notice check whether the battery's positive/negative terminal is loose, and confirm whether the battery's voltage is normal

Check the warning light of ABS and brake system

- 1). Check whether when the ignition switch turns to "ON", the ABS warning light will light for 3 seconds, and the brake warning light keeps lighting. If they don't light, please refer to "common failures and analysis process of ABS"
- 2). Check whether after 3 seconds when the ignition switch turns to "ON", the ABS warning light will go out, and the brake warning light will go out after the engine starts. If not, please refer to "common failures and analysis process of ABS"
- 3). If the ABS warning light doesn't go out in 10 seconds after the engine starts, please refer to "common failures and analysis process of ABS"

△Notice the brake warning light will turn on during parking brake process (when the switch is at "ON" position) and when the brake fluid's liquid sensor is working

Use fault diagnosis instrument to check ABS control module

Use fault diagnosis instrument to check the data and failure code of control module, and repair the vehicle according to the failure codes. Please refer to "failure diagnosis"

(IV) Torque parameter

No.	Project	Torque (N·m)	Remark
1	Fixing bolt of speed sensor	8~10	
2	Collar nut of brake pipe	16~18	

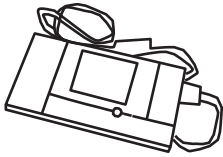
3	The bolt that connects ABS controller and car body	20~25	
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(V) Maintenance precautions

During the maintenance of ABS and ESP, please pay attention to the following precautions, or they may suffer unnecessary damages due to improper maintenance

1. Before undertake the electric welding, disconnect the connector assembly from ABS control module
2. The spare parts in ABS is very sensitive to EMI, please confirm that no interference exists in all parts' traces, position, installation, connectors and supports.
3. Do not use quick charger to start the engine or charge the battery which is connected to the engine, because this will make battery invalid or cause damage to the spare parts in ABS.
4. Make sure the ignition switch be closed first, then disconnect the negative terminal of battery, and disconnect the connector of ABS control module
5. Do not try to repair any spare parts in ABS, since all parts of ABS can only be replaced
6. Do not hang the suspension's parts on the harness of speed sensor, in case of damage on sensor's harness.
7. The ABS control module cannot be placed under situation whose temperature is higher than 105 °C.
8. Chlorine, sulphur and relevant inorganic substances cannot exist in brake circuit, nor the mineral oil or ester/lubricant plasticizer, including parts that may ooze these kinds of substances.
9. During ABS operation, the brake pedal will vibrate mildly with mechanic noise. These are normal circumstances.
10. When the ignition switch is turned to "ON" position and the car is started, the brake pedal may vibrate, and the motor in ABS hydraulic assembly may make some noises. These are normal circumstances during operation check.
11. When the vehicle is running on bumpy, sand or deep fresh-snow road, the brake distance may be longer than vehicles without ABS.

(VI) Special tools

No.	Tools	Mechanical dimensions	Illustration
1	Fault diagnosis instrument		ABS&ESP fault diagnosis

III Failure diagnosis

(I) Brief introduction of failure diagnosis

- 1). Failure diagnosis can thoroughly understand every system of the vehicle
- 2). Understand the customer's complaint before the check, and inquire their dissatisfaction in detail after fighting out the failure.
- 3). Make sure check the vehicle's failure from the

beginning in order to comprehensively repair the fault. For intermittent failure, it is very important try to reappear the failure according to the talk with customer and past cases.

Do not check under some special situations, as most intermittent failures are caused by poor contacts. Under this situation, swaying suspectable harness or connectors with hands is an effective way.

4). After the diagnosis, be sure to “clear trouble codes”

(II) Fault diagnosis chart

Failure code chart for ABS

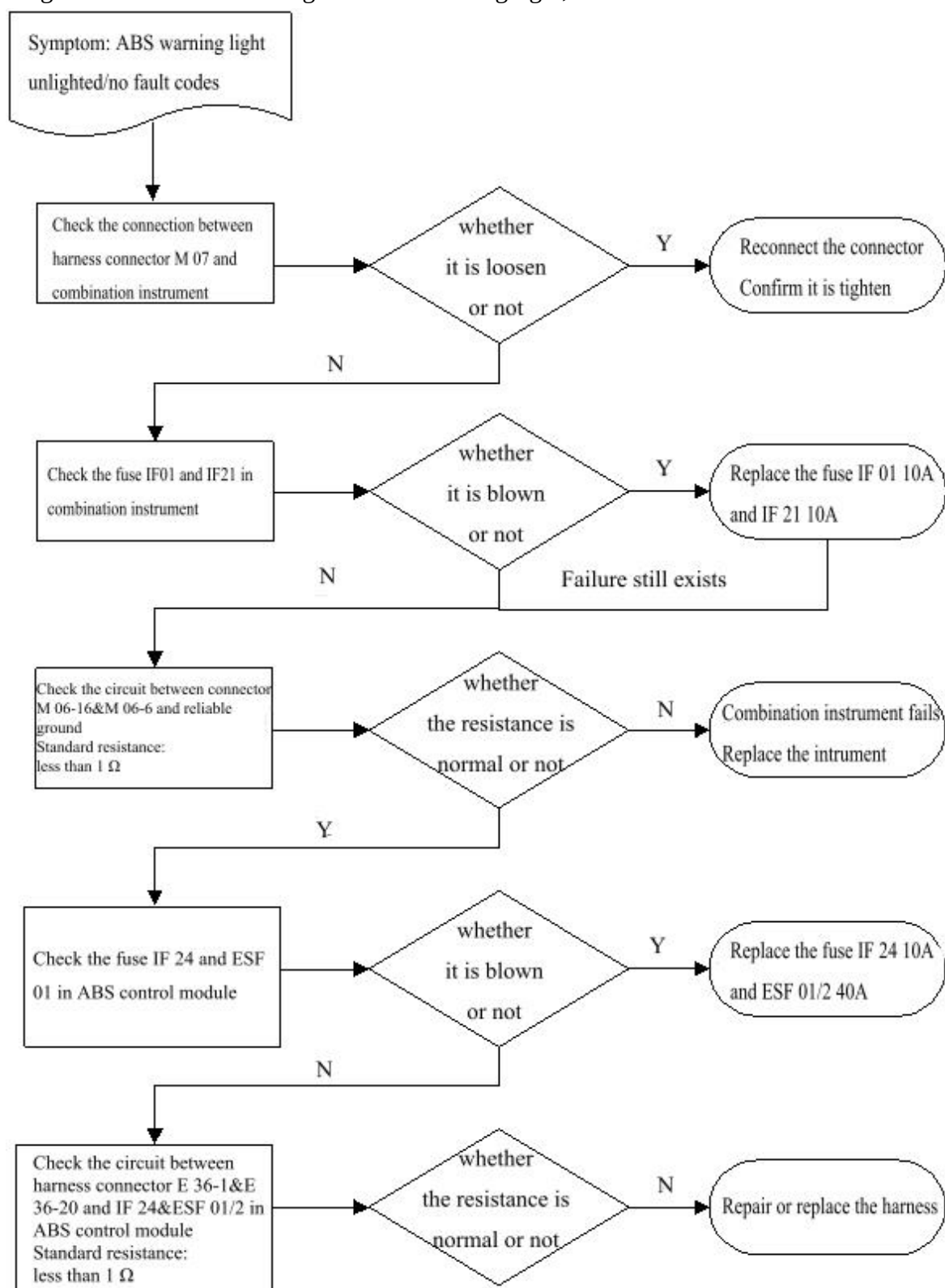
Trouble code	Failure illustration
C190104	Inadequate ECU's voltage
C100004	Failure of ECU's hardware

Failure diagnosis chart for ABS

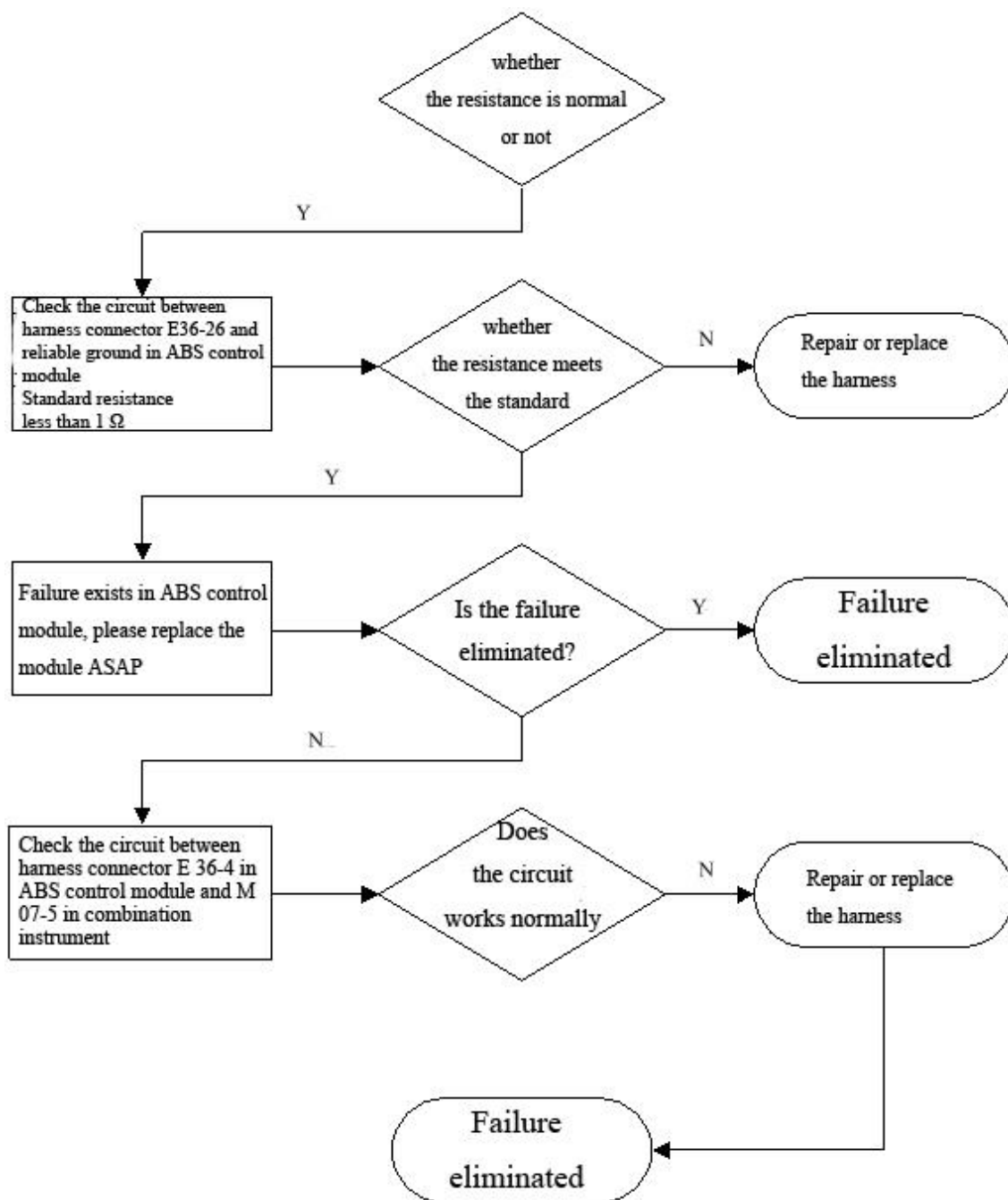
No.	Symptom	Analysis on symptom	Solutions	Remark
1	Cannot read the data stream of ABS control module	Poor contact of diagnosis port	Check and connect	Please refer to “diagnostic flow chart of unabling to read ABS data stream”
		ABS control module unearthed	Check and replace	
		The battery hasn't provided voltage to ABS control module	Check and replace	
		The ignition switch hasn't provided voltage to ABS control module	Check and replace	
		The data circuit is broken or in short-cut	Check, connect or replace	
		Excessive data circuit's electric resistance	Check and replace	
2	ABS warning light cannot be lighted	ABS warning light fails/socket loosening	Check, connect or replace	Please refer to “diagnostic flow chart of unlighted ABS warning light, no trouble codes”
		Dashboard's fuse broken	Check and replace	
		Drive module of dashboard's warning light fails	Check and replace	
		ABS control module fails	Check and replace	
		The circuit between dashboard and ABS control module is broken or in short-cut	Check, connect or replace	
3	ABS warning light keeps lighting	Open circuit between dashboard and ABS control module	Check and connect	Please refer to “diagnostic flow chart of ABS warning light keeps lighting, no trouble
		Short circuit between dashboard and ABS control module	Check and replace	
		Drive module of dashboard's warning light fails	Check and replace	

		ABS control module unearthed	Check and restore	codes”
		ABS control module fails	Check and replace	

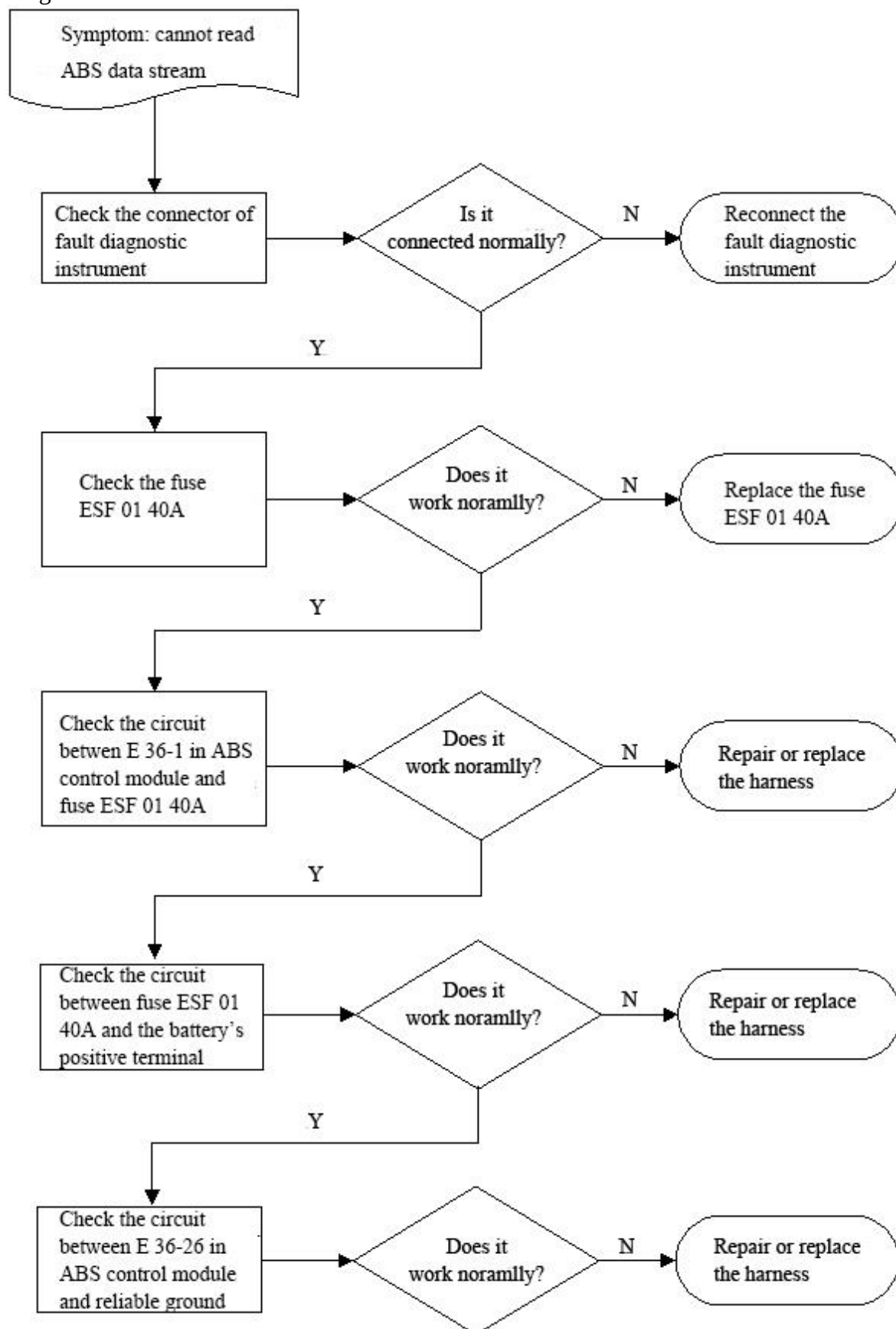
Diagnostic flow chart of unlighted ABS warning light, no trouble codes



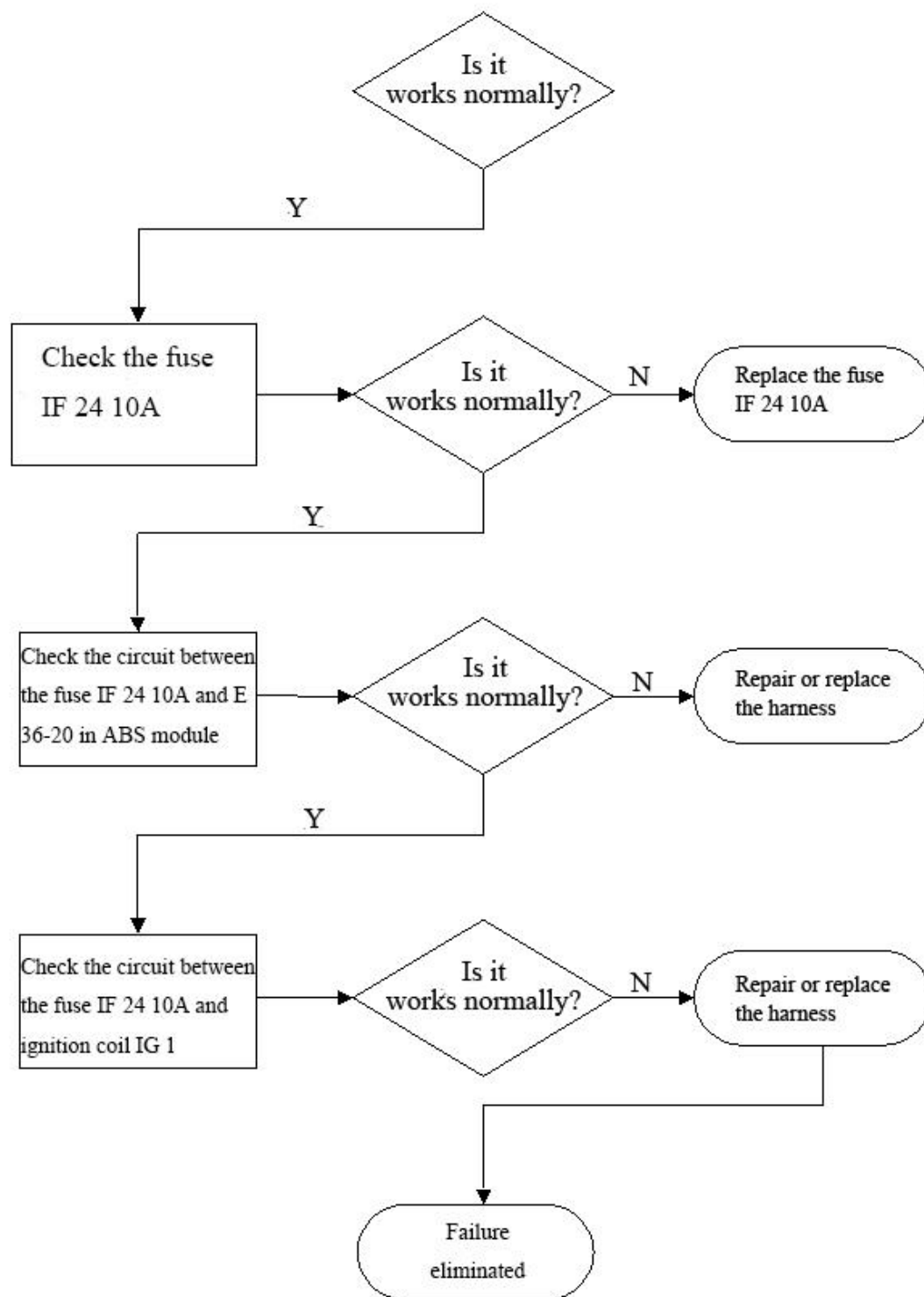
Diagnostic flow chart of unlighted ABS warning light, no trouble codes (continue)



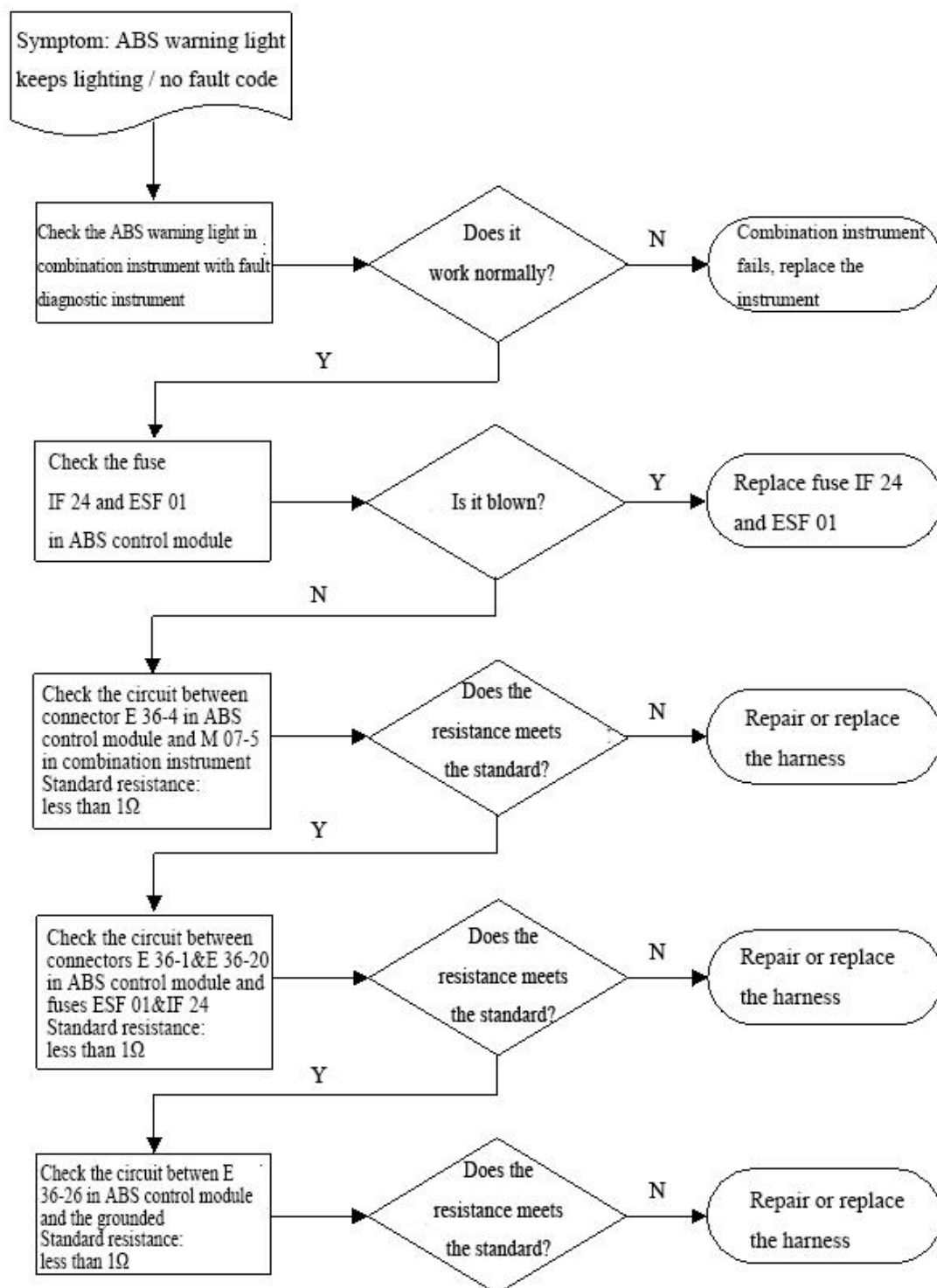
Diagnostic flow chart of “unable to read ABS data stream”



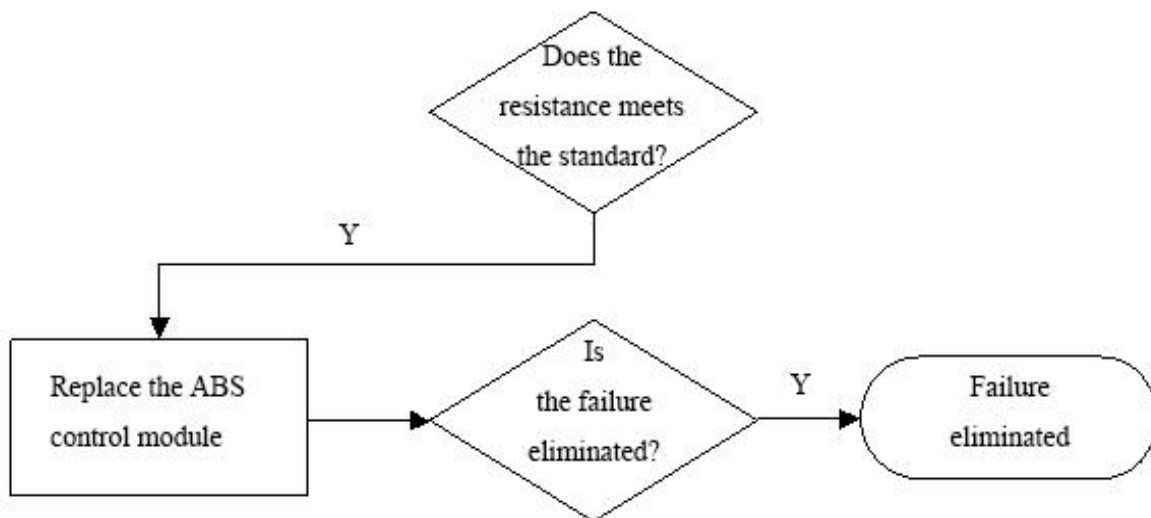
Diagnostic flow chart of “unable to read ABS data stream” (continue)



Diagnostic flow chart of ABS warning light keeps lighting, no trouble codes



Diagnostic flow chart of ABS warning light keeps lighting, no trouble codes (continue)



Diagnostic information and procedures

1. Self-diagnostics

ABS control module can implement self-diagnostics on system and check the faults within. Once it finds any fault, it will set diagnostic trouble code (DTC), lighten the ABS warning light, and shut down the ABS system.

2. Reveal DTC

Specific scan tool (diagnostic instrument) can reveal the DTC

3. Clear DTC

DTC which is in the memorizer of ABS control module can be cleared by scan tool (diagnostic instrument)

△Notice please verify whether the system works normally after the clearance procedure, and whether the DTC doesn't appear again. The DTC cannot be cleared by dismantling the connector of ABS control module, disconnecting the battery or stopping the engine.

4. The following situations may cause intermittent failure or poor contacts:

- 1). Error in electrical wiring
- 2). Error in electrical connection
- 3). Stagnation in electric valve or electromagnetic valve

5. Initialization's order

ABS control module will set out initialization test during every beginning of ignition period. The initialization order is electromagnetic valve and pump motor. Once the failure is detected, ABS control module will set corresponding diagnostics.

During initialization period, there will be some noises and vibrations, which are a part of normal system operation. If the ABS control module finds no signal input in brake switch (when your feet are away from the pedal), the initialization will be set out immediately. If there is signal input in brake switch (your feet are on brake pedal), the initialization will not be set out till no signal input is detected, or the speed reaches 25 Km/h.

(III) Diagnostic check on circuit

1. System introduction

Circuit diagnostics can detect problems caused by failures of ABS or EBD. The diagnostic check on circuit can lead the technicians to diagnose the failures.

2. Diagnostic procedures

The procedures of ABS/EBD's maintenance come follow:

- 1). Check whether any mechanical failure exists in brake system

- (1). Is the liquid level of fluid reservoir correct?
- (2). Is there any pollution in the brake fluid?
- (3). Is there any leakage in brake's master cylinder or ABS hydraulic assembly?
- (4). Do all spare parts in brake system work normally?
- (5). Is there any stagnation during braking?
- (6). Is the braking steady?
- (7). Are the brake shoes broken?
- (8). Are the bearings broken?
- (9). Do all sensors and harness work normally?
- (10). Check whether the sensors' connectors and tooth rings are broken, and check the wheel's abrasion degree
- (11). Test the vehicle on road, check and correct the situation.

2). Set out diagnostic check on circuit

Please follow the corresponding diagnostic procedures during the circuit check. When all systematic failures are eliminated, please clear the trouble code of ABS. Please refer to the following chart for specific procedures and solutions.

Chart of diagnostic check on circuit

Procedures	Concrete measures	Next measure	
		Y	N
1	If possible, connect and install all spare parts which have been disconnected or dismantled	Turn to procedure 2	Turn to procedure 4
	Turn the ignition switch to "ON", and the engine is dead		
	When install the appropriate diagnostic instrument on DLC, does it communicate with ABS control module?		
2	Are there any current or past DTC stored?	Turn to procedure 3	Turn to procedure 7
3	Record the current or the past DTC, and the historical data, like the times when each DTC appears, the time when each DTC first appears, the latest time when each DTC appears, the DTC's setting speed, and other relevant data that can help the diagnostics. Do not clear DTC before the diagnostic instrument	Turn to procedure 5	Turn to procedure 6

4	Can the instrument communicate with other modules that in the same data circuit?		
5	Refer to "no communication with ABS control module" in failure procedure of ABS control module		
6	Refer to "data chain connector unit of electrical terminal"		
7	Shut down the engine	Turn to procedure 8	Turn to procedure 9
	Wait for 10 seconds		
	Start the engine		
	Observe the ABS warning light after the engine has started		
8	Does there any light keep lighting?	Turn to procedure 9	Turn to procedure 10
9	Refer to failure procedure of the corresponding light "keeps working"		
10	Refer to failure procedure of the corresponding light "out of operation"		

IV Air-removal of ABS system

(I) Special tool

No.	Tool	Mechanical dimension	Introduction
1	Fault diagnostic instrument		Systematic trouble diagnostics for ABS/ESP

(II) Conditions that needs air-removal

Should any of the following condition happen, it is necessary to remove air from ABS:

1. The traditional air-removal method for brake pipeline cannot achieve the pedal's height that needs.
2. The ABS controller assembly is replaced.
3. Extreme fluid loss
4. Suspicion that some air exists in ABS controller.

This program, by using diagnostic instrument, can drive the system's valve, run the pump motor, and remove air from secondary circuits. These circuits are closed during normal condition, and open during only the initialization or ABS's working periods. The automatic air-removal program can open these secondary circuits, exhaust all air and collect it inside the ABS controller assembly, where it can be exhausted out of the system.

(III) Air-removal of ABS

1. Necessary tools
 - 1). Diagnostic instrument installed with correct software
 - 2). Brake fluid

- 3). Lifting jack
- 4). Gas-exhaustion bottle with hose that can recycle fluid in the vehicle
- 5). Appropriate safety equipment, like safety glasses
- 6). Two maintenance personnel: one needs to stamp the brake pedal and control the instrument, and the other one needs to maintain the liquid level of hydraulic oil in master cylinder, and adjust the air-removal screw according to the instrument's judgement.

2. Preliminary check

- 1). Check the battery's charging condition, and repair the battery and charging system if necessary
- 2). Connect the diagnostic instrument and choose the current or past DTC. Clear all DTC before the procedure of ABS's air-removal. If DTC cannot be cleared, please eliminate the failures first.
- 3). Check whether any damage or leakage exists on vehicle's appearance, and repair them if necessary.

△Notice by pressing the "EXIT" button on diagnostic instrument, you can terminate auto air-removal program at any time

3. Air-removal in the car

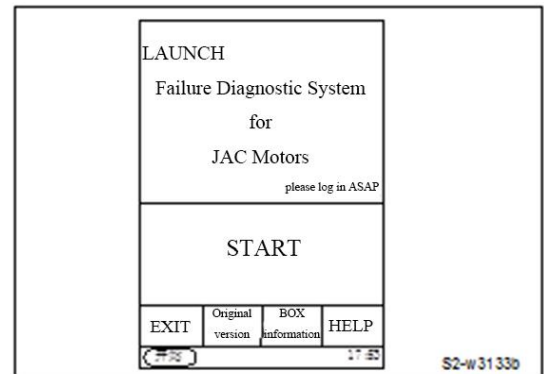
- 1). Choose "auto air-removal program" and follow the instructions. (Please refer to practical program in diagnostic instrument)
- 2). During basic and auto air-removal, please stamp the brake pedal to maintain the liquid level of brake fluid in master cylinder
- 3). When exhaust air for a wheel, keep the hose jointing with air-removal screw, and exhaust air into chamber with brake fluid. The chamber must be 30mm higher than the bolt of hose filled with brake fluid, in order to prevent air from entering brake pipeline.
- 4). The first step is basic air-removal. This step must be carried out before auto air-removal, in order to get better pedal's height and driver's feeling, and maintain the ABS's best performance.
- 5). The first step of auto air-removal is to loosen the pump and pressure-reduction valve for 30 seconds. Air-removal screw doesn't need to be opened during this step. The brake pedal keeps increasing and reducing pressure during the whole process.
- 6). During the next step, the instrument will ask the personnel to open one of the air-removal screws, and the instrument will circularly check the pressure valve and pump motor for 30 seconds. The brake pedal keeps increasing and reducing pressure during the whole process.
- 7). For the remaining air-removal screws, the instrument will repeat step 6 to remove air.
- 8). When the auto air-removal program completes, the instrument will display relevant information.
- 9). Stamp the brake pedal to test the pedal's height and driver's feeling. Repeat step 1 to 8 till the pedal's feeling is acceptable.

△Notice when repeat the operation, the auto air-removal program may stop temporarily into "cooldown" mode

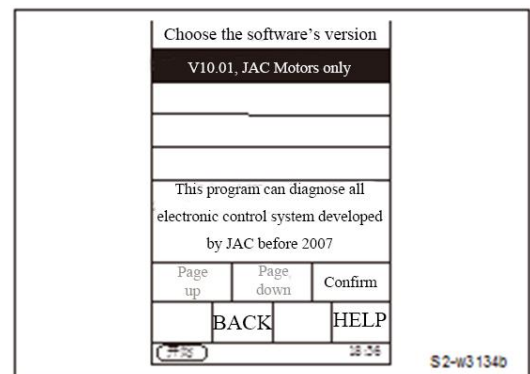
△Notice only continue the next step when the time for the current step is up, and all steps cannot be skipped.

4. Auto air-removal

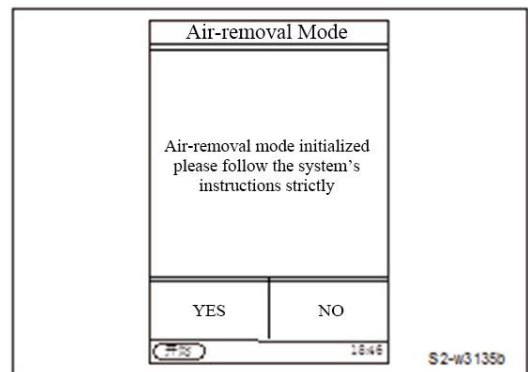
1). Launch the failure diagnostic system for JAC Motors



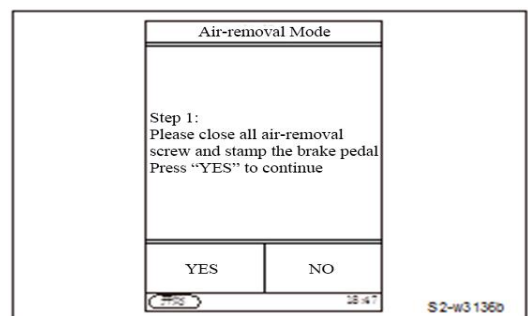
2). Choose the V10.01 system for JAC Motors only



3). Launch the auto air-removal program

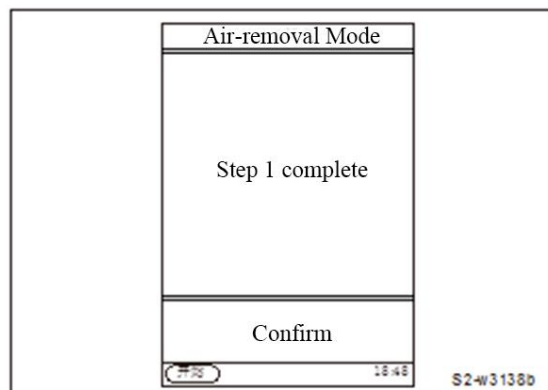


4). Carry out the first step

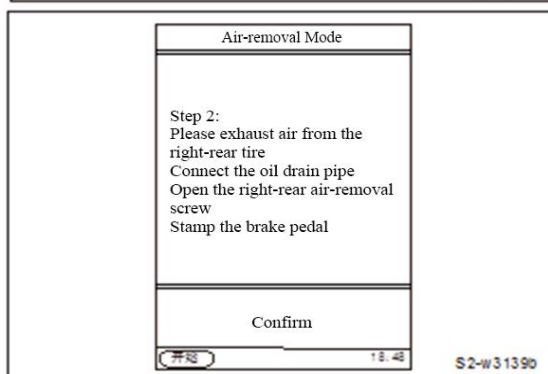


5). Air-removal is in process

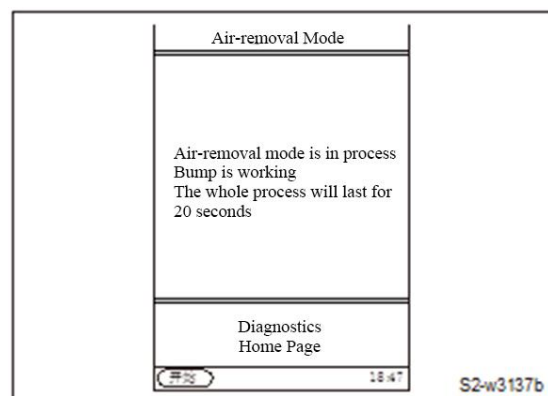
6). Step 1 is complete



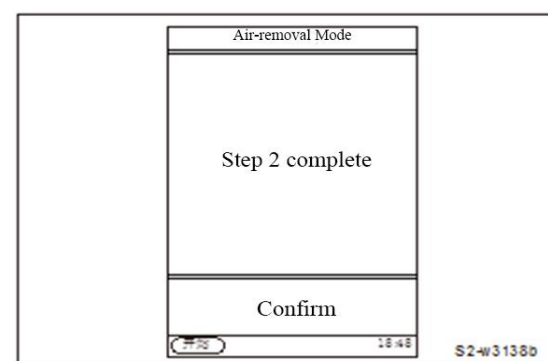
7). Carry out step 2



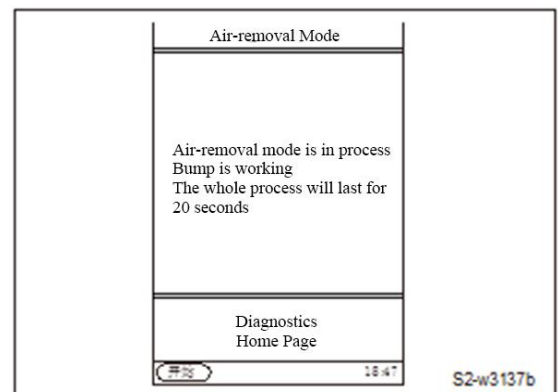
8). Air-removal is in process



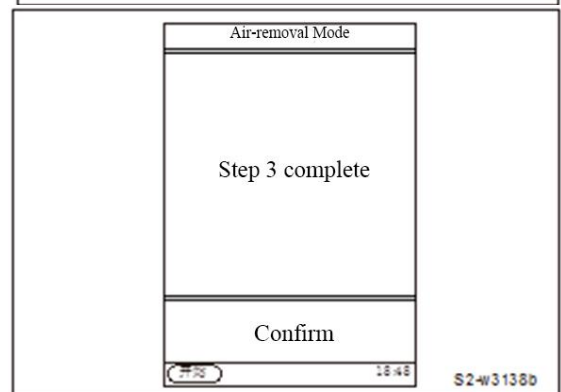
9). Step 2 is complete



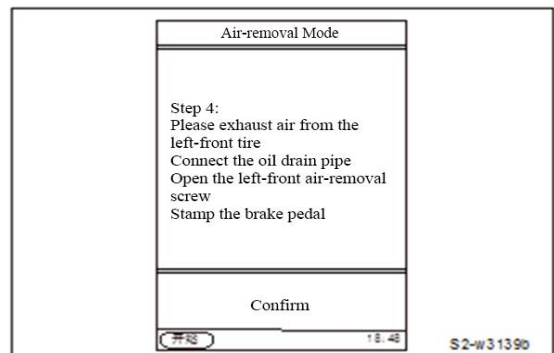
10). Air-removal is in process



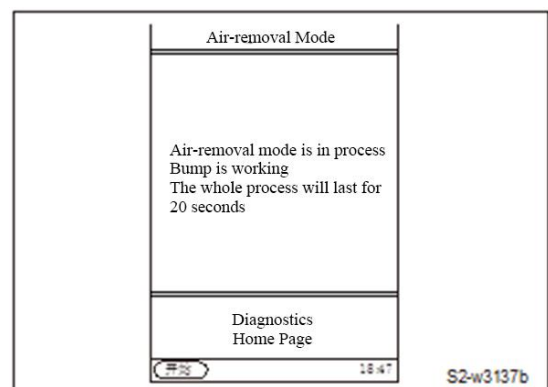
11). Step 3 is complete



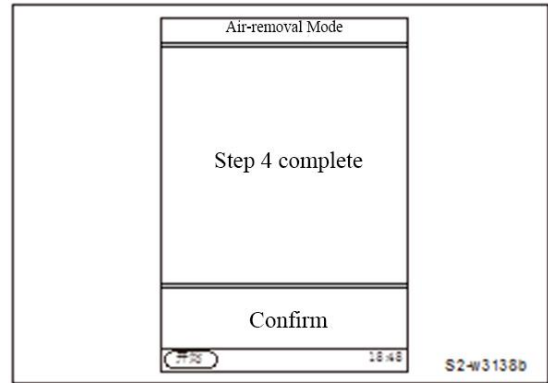
12). Carry out step 4



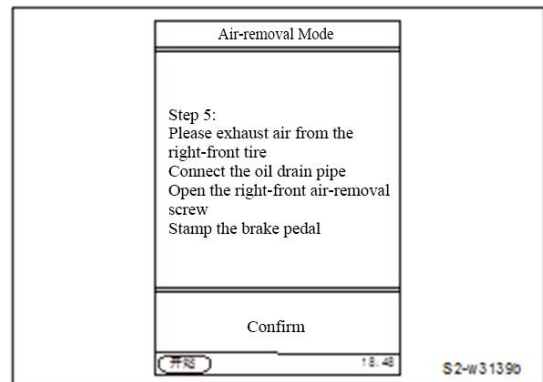
13). Air-removal is in process



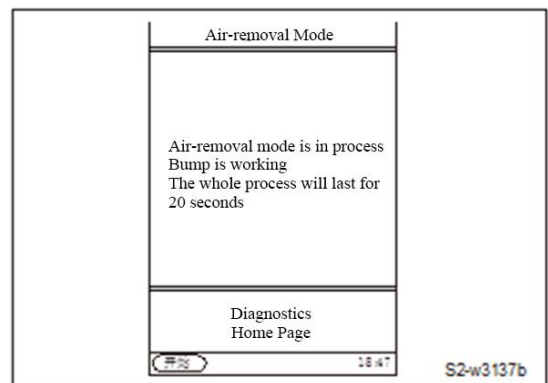
14). Step 4 is complete



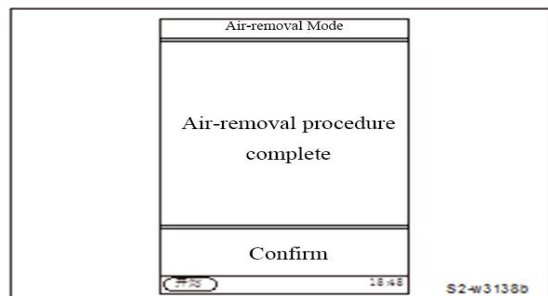
15). Carry out step 5



16). Air-removal is in process



17). Air-removal process is complete

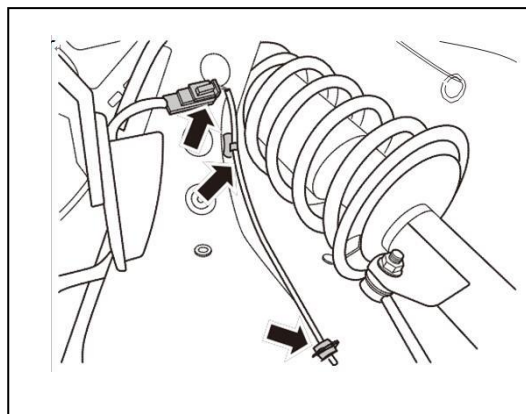


V Front wheels' ABS wheel speed sensor assembly

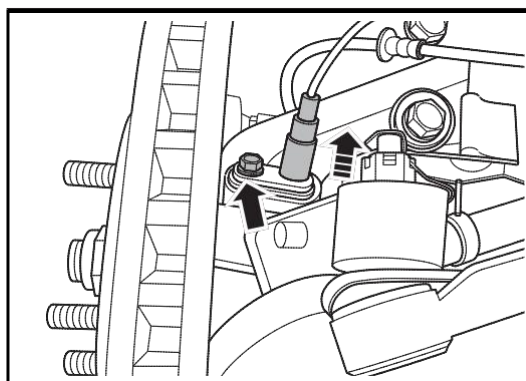
(I) Disassembly

1. Open the engine hood
2. Disconnect the negative cable of battery
3. Dismantle the front wheels, please refer to “wheels”
4. Dismantle front wheels' cover, please refer to “front wheel's cover”
5. Disassemble the front wheel's ABS wheel speed sensor assembly

- 1). Disconnect the harness connector of front wheels' speed sensor
- 2). Uncouple the buckle that connects sensor's harness and vehicle body, two fixing points, and the fixing point which connects with front shock absorber



- 3). Remove the fixing bolt that fixes the front wheel's speed sensor, and take out the sensor slowly.



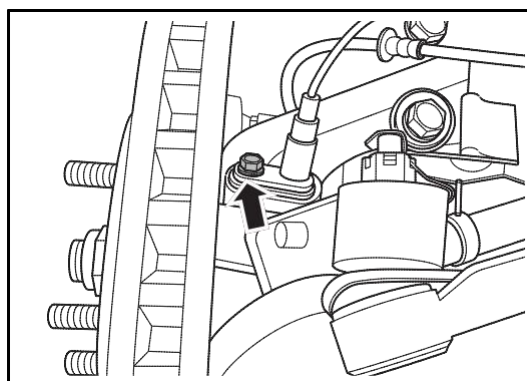
(II) Installation

1. Install the front wheels' ABS wheel speed sensor assembly

- 1). Install the fixing bolt that fixes speed sensor
- Tightening torque 8~10N.m

△Notice

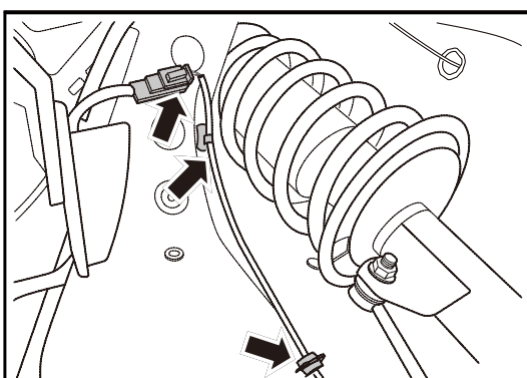
1. Do not drag the sensor's harness brutally



2. Mind the gap between speed sensor and signal's gear ring

Standard: 0.2~1.1mm

- 2). Install the buckle that connects sensor's harness and vehicle body, two fixing points, and the fixing point which connects with front shock absorber
- 3). Connect the harness connector of front wheel's



speed sensor

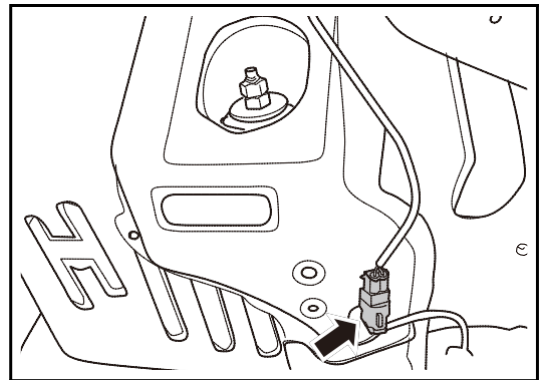
2. Install the front wheels' cover
3. Install the front wheels
4. Connect the negative cable of battery
5. Close the engine hood

VI Rear wheels' ABS wheel speed sensor assembly

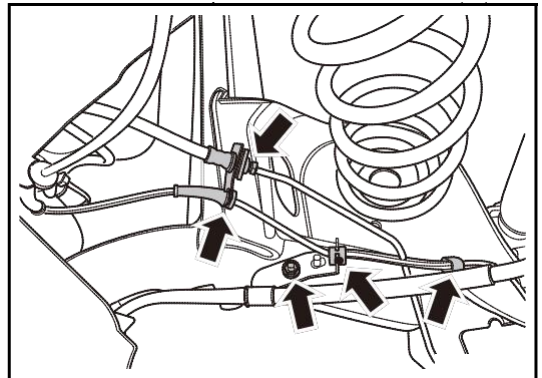
(I) Disassembly

1. Open the engine hood
2. Disconnect the negative cable of battery
3. Dismantle the rear wheels, please refer to "wheels"
4. Dismantle the rear seat's cushion, please refer to "rear seats"
5. Dismantle the rear seat's backrest, please refer to "rear seats"
6. Dismantle the rear seat's rotating bracket
7. Dismantle C column's trim and decorated board
8. Dismantle the rail-gate threshold's cover
9. Dismantle the rear-gate threshold's cover
10. Dismantle the tailgate's side panel threshold's cover
11. Disassemble the rear wheels' ABS wheel speed sensor assembly

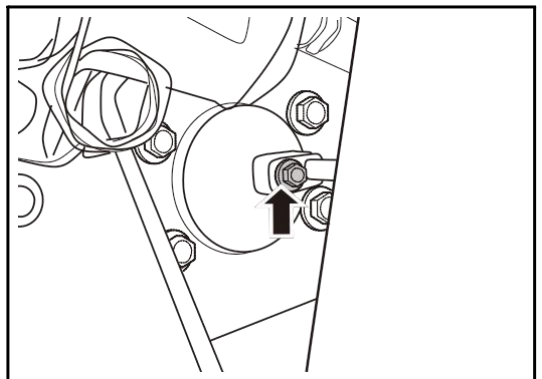
- 1). Disconnect the rear wheels' speed sensor's harness connector



- 2). Uncouple the buckle that connects sensor's harness and vehicle body, and the three fixing point which connect with rear torsion beam



- 3). Remove the fixing bolt that connects the rear wheel's speed sensor and rear hub assembly, and take out the sensor slowly.



(II) Installation

1. Install the rear wheels' ABS speed sensor assembly

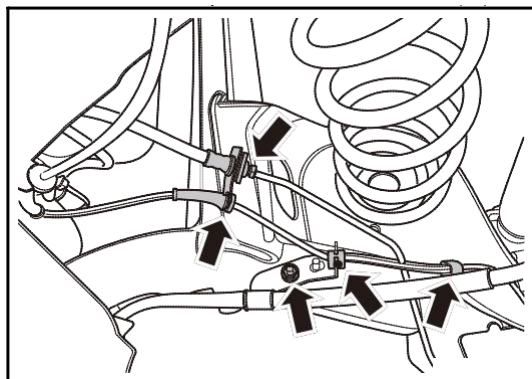
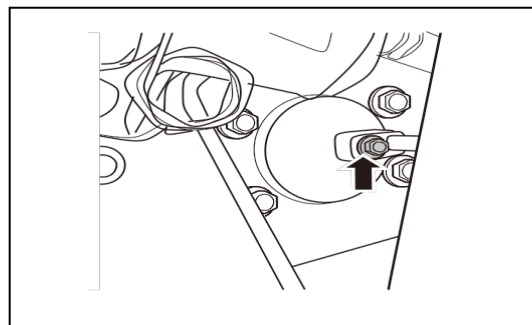
- 1). Install the fixing bolt that fixes rear wheels' speed sensor

Tightening torque 8~10N.m

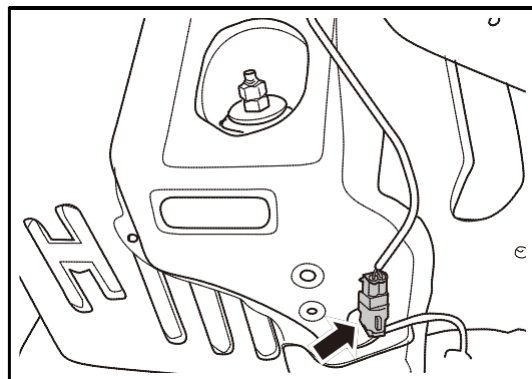
△Notice

1. Do not drag the sensor's harness brutally
2. Mind the gap between speed sensor and signal's gear ring

Standard: 0.2~1.1mm

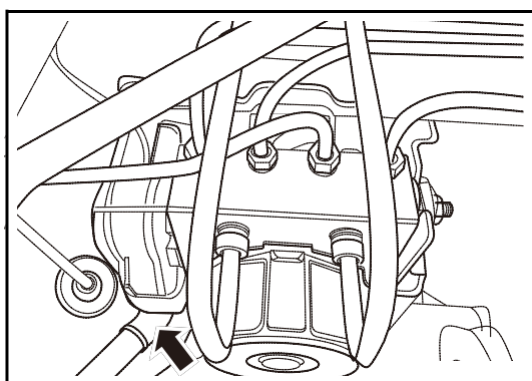


- 2). Install the fixing point that connects sensor's harness and vehicle body, and the three fixing points that connect with rear torsion beam



- 3). Connect the harness connector of front wheels' speed sensor

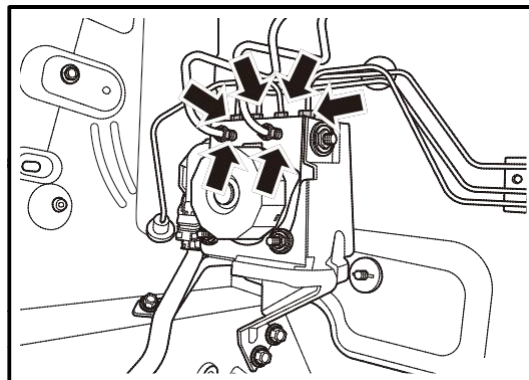
2. Install the front wheels' hub
3. Install the railgate's side panel
4. Install the reargate's threshold cover
5. Install the tailgate's threshold cover
6. Install the rear seat's rotating bracket
7. Install the C column's trim and decorated
8. Install the rear seat's backrest
9. Install the rear seat's cushion
10. Install the rear wheels
11. Connect the negative cable of battery
12. Close the engine hood



VII ESP controller assembly

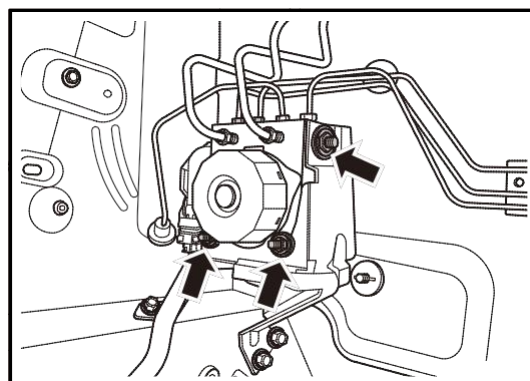
(I) Disassembly

1. Open the engine hood
2. Disconnect the negative cable of battery
3. Drain the brake fluid, please refer to “brake fluid”
4. Dismantle ESP controller assembly
 - 1). Disconnect the harness connector of ESP controller assembly



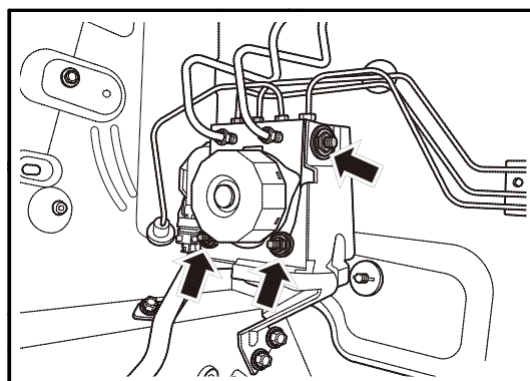
- 2). Disassemble the oil outlet tube assembly in master cylinder, front brake pipeline assembly and right-front brake oil pipe assembly, which are connected to ESP controller assembly

- 3). Dismantle the ESP controller's support and the three fixing nuts that fix the support
- 4). Take out the ESP controller



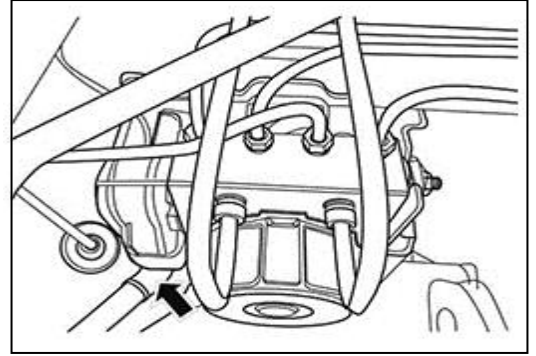
(II) Installation

1. Install the ESP controller
 - 1). Install the three fixing nuts that connect ESP controller and the support



2). Install the oil outlet tube assembly in master cylinder, front brake pipeline assembly and right-front brake oil pipe assembly, which are connected to ESP controller assembly

Tightening torque 16~18N.m



3). Connect the harness connector of ESP controller assembly

2. Add brake fluid, please refer to “brake fluid”

3. Exhaust air from brake system, please refer to “air-removal of brake system”

4. Connect the negative cable of battery

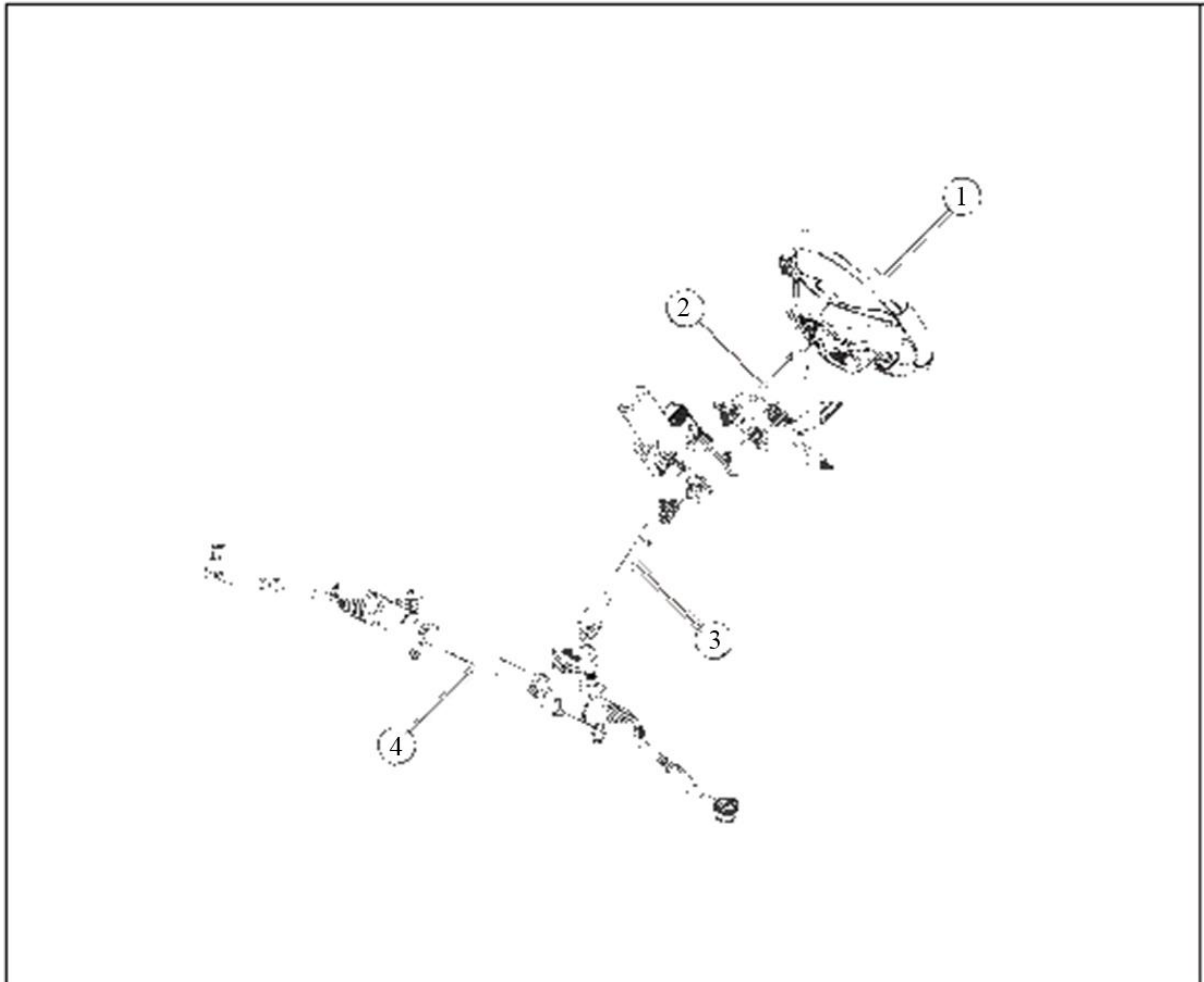
5. Close the engine hood

EPS (Electronic Power Steering)

I Brief introduction

(I) Structural introduction

EPS's structural diagram

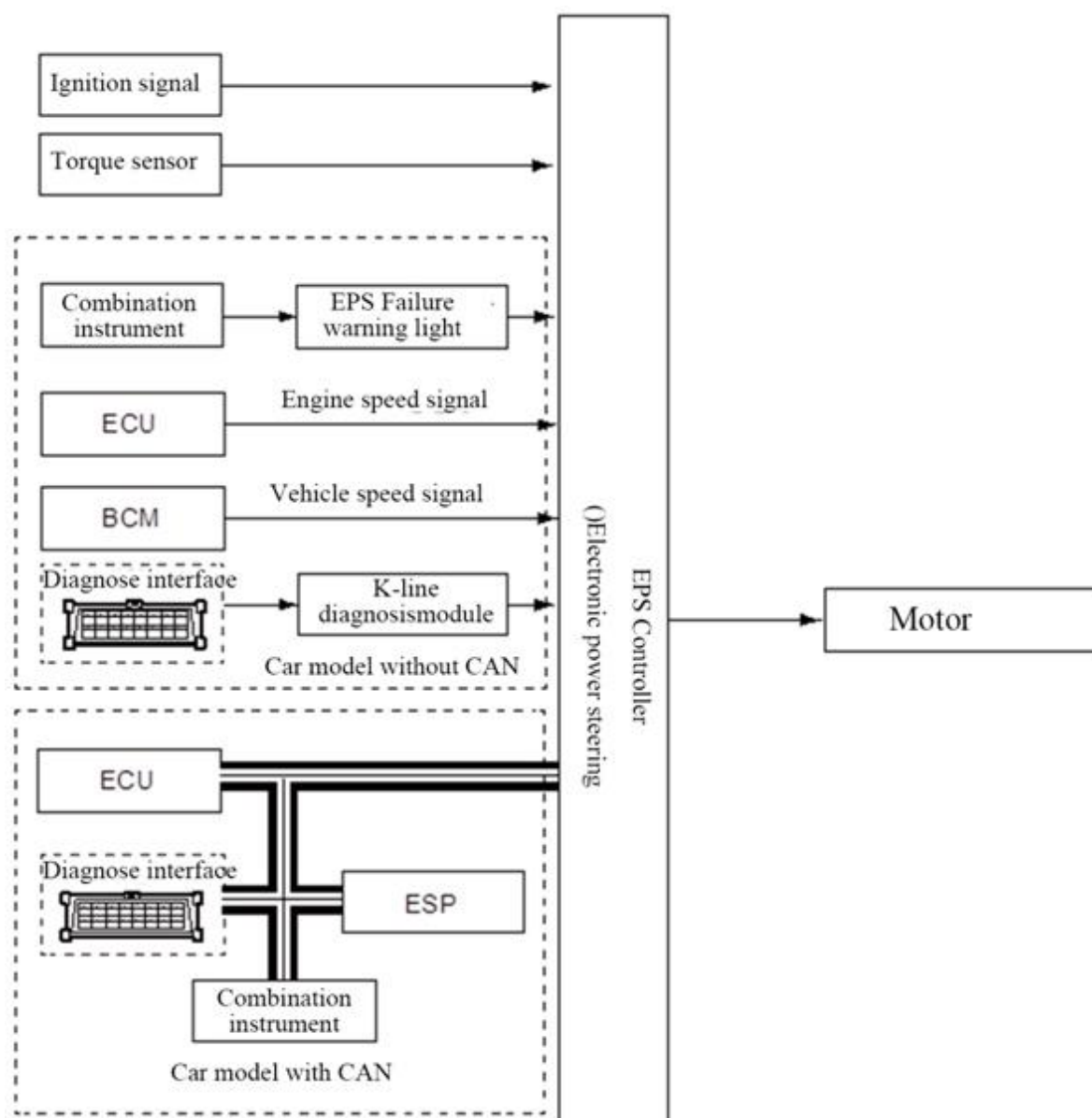


- 1. Steering wheel assembly
- 2. Steering column assembly

- 3. Steering shaft with universal shaft
- 4. Steering gear assembly

(II) System's working principle

Diagram of system's working principle



(III) Maintenance parameter

Project	Standard
Type of manual steering gear	Gear rack
Parameter of steering wheel	φ375mm
Steering column and lower shaft	Crumple level 3
Operating torque of steering wheel	≤ 5N·m
Power steering gear rack's travel distance	134±1mm
Cord's transmission ratio	46.82
Steering wheel's number of turns	2.86±0.04

(IV) Torque parameter

No.	Project	Torque	Remark
1	Steering wheel's fixing nut	42~52	
2	Steering column's installing nut	20~25	
3	Steering column's installing bolt	20~30	
4	Controller support's fixing bolt	8~10	
5	Connecting bolt of steering column assembly and steering shaft	30~35	
6	Connecting bolt of steering shaft assembly and manual steering gear	30~35	
7	Primary fixing bolt of manual steering gear	95~105	
8	Secondary fixing bolt of manual steering gear	95~105	
9	Toe-in adjusting nut of steering tie rod	45~55	
10	Slotted nut of steering gear's external ball	40~50	

(V) Maintenance precautions

1. When checking steering system, park the car on dry and level ground
2. All bolts of spare parts in steering system must be tightened with standard torque
3. Check the wheel alignment after finishing the maintenance of steering column assembly, steering gear and other steering part.
4. The system's voltage standard is 9~18V.
5. Check the tire's pressure often and make sure it meets the standard.
6. Once abnormal gap or front-sway appears, confirm which system or assembly the problem exists in, and solve the problem.
7. Check whether the spare parts of steering system suffer abnormal crash, and replace the broken or problematic parts immediately
8. It is unacceptable to weld any part of steering gear or system rod piece.
9. Check regularly whether any interference or abrasion is on EPS harness, or whether the connector is loosen, and replace harness if necessary.

II Failure diagnosis
(I) Chart of diagnostic trouble codes for EPS

No.	DTC	Description
1	C1611	Failure happens in torque sensor's main signal
2	C1613	The difference between primary and secondary circuit of torque sensor is excessive
3	C1614	Torque sensor's power failure
4	C1615	Failure of signal in torque sensor's secondary circuit
5	C1621	Vehicle speed's signal loss
6	C1622	Wheel speed's signal loss
7	C1624	Vehicle speed's reduction exceeds normal level
8	C1641	Motor's circuit is open or I short-out; drive circuit is
9	C1642	Motor's practical current is far higher than estimated

10	C1643	Motor's current is too excessive
11	C1645	Motor's practical current is far lower than estimated current
12	C1651	Angle transducer's signal is abnormal
13	C1652	Controller's relay fails
14	C1653	Power voltage is too low
15	C1654	Power voltage is too high
16	C1655	Drive failure (over-temperature, undervoltage)
17	U0073	EPS communication is down
18	U0100	Loss of communication with EMS/ECU
19	U0129	Loss of communication with ABS/BSM
20	C1611	Torque sensor-primary signal's cross-border
21	C1612	Torque sensor-secondary signal's cross-border
22	C1613	Torque sensor-sum of primary and secondary signal brakes
23	C1614	Torque sensor-torque sampling overtime
24	C1661	Relay's circuit is open
25	C1621	Battery's voltage is too high
26	C1622	Battery's voltage is too low
27	C1662	Current sensor-mid-current's calibration error
28	C1663	Current sensor-excessive current
29	C1664	+5VA voltage error
30	C1632	EEPROM data consistency failure
31	C1643	Ignition signal loss
32	C1651	Motor-circuit's short-out
33	C1667	Temperature sensor-MOSFET overheat
34	C1615	Angle sensor-PWM's duty-ratio exceeds the limit
35	C1617	Angle sensor-angle's calculation error
36	C1615	Angle sensor-PWM frequency is abnormal
37	C1616	Angle sensor-P or S signal sampling overtime
38	C1641	CAN- invalid vehicle speed
39	C1641	CAN- vehicle speed sampling is overtime
40	C1642	CAN- invalid wheel speed
41	C1642	CAN- wheel speed sampling is overtime
42	U1000	CAN-BUSOFF

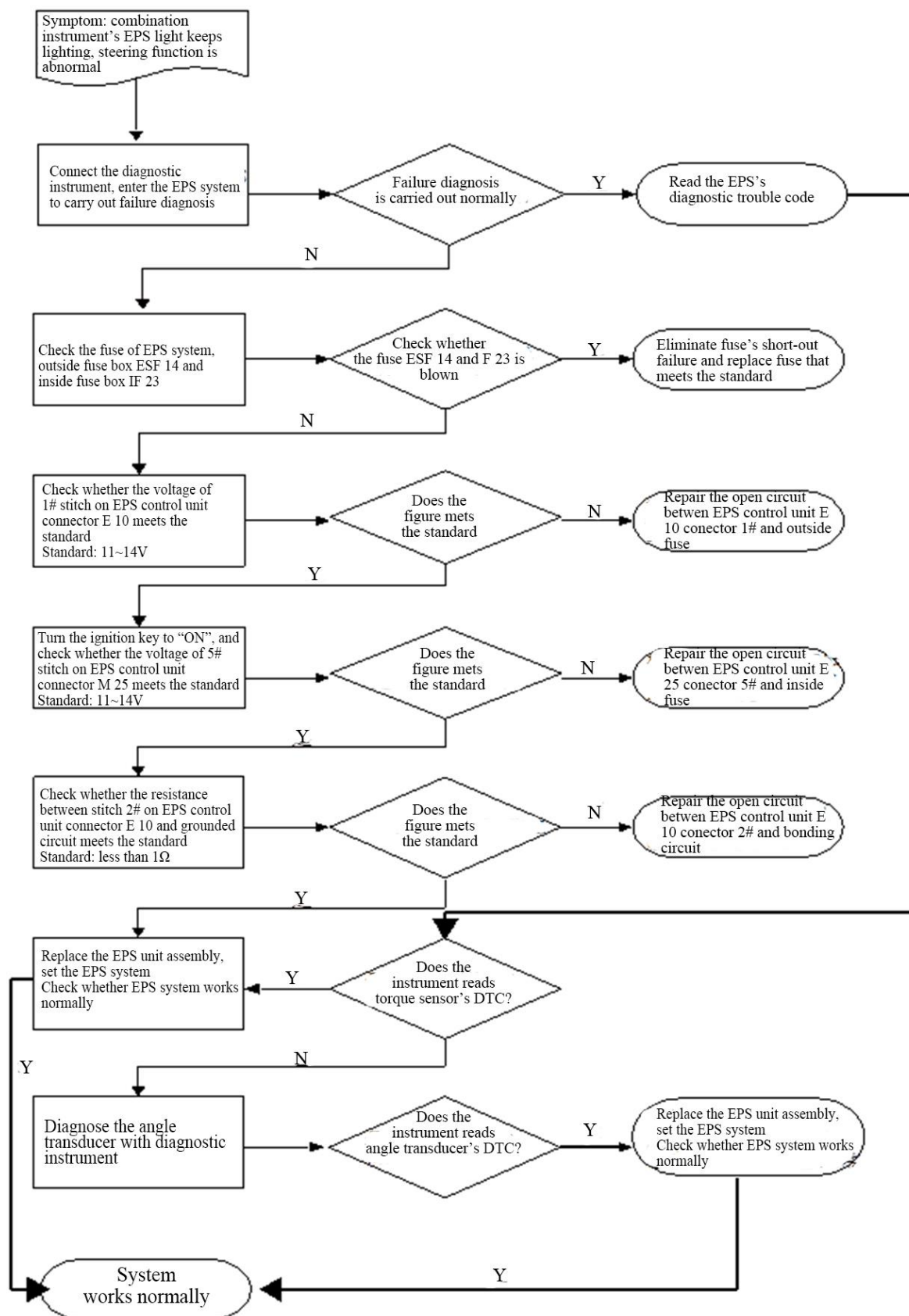
43	U1000	CAN-message transmission overtime
44	C1665	EPS controller-inside failure

(II) Failure diagnosis

No.	Symptom	Failure's reason	Solution	Remark
1	Vehicle's deviation	Steering wheel's ball joint is loosen or the front wheel's alignment is inappropriate	Adjust the alignment and ball joint in steering wheel	Please refer to "vehicle's steering system check"
		Steering lever system is broken or suffer excessive abrasion	Check and adjust each joint part in steering system according to the instructions	
		Rack's pre-tightening degree is in maladjustment.	Adjust or repair the rack's pre-tightening degree in the steering gear	
2	Power-steering is sporadic or back to normal after restarting the engine.	Harness connector is loosen or in poor contact	Check and reconnect the connectors, make sure they are connected firmly	Please refer to "vehicle's steering system check"
		Motor's fuse is loosen or in poor contact	Re-install the fuse, make sure it is installed properly	
		Motor's failure	Replace the motor	
		EPS controller's failure	Replace the EPS	

(III) Diagnostic flow chart

Flow chart of combination instrument's EPS warning light keeps lighting, no steering function



III Vehicle's steering system check

(I) Check

1. Check the installation

- 1). Check the installing situation of steering gear assembly, front suspension, axle and steering column
- 2). Check whether there is any gap during axial movement
- 3). Check whether the fixing nuts and bolts of steering gear assembly are loosen

2. Check the free-running distance of steering wheel

- 1). Turn the steering wheel and keep the front wheels straight ahead. Start the engine, and slightly turn the wheel left or right, till the front wheel starts to move, and measure the steering wheel's distance on the excircle

Steering wheel's free-running distance: 30mm

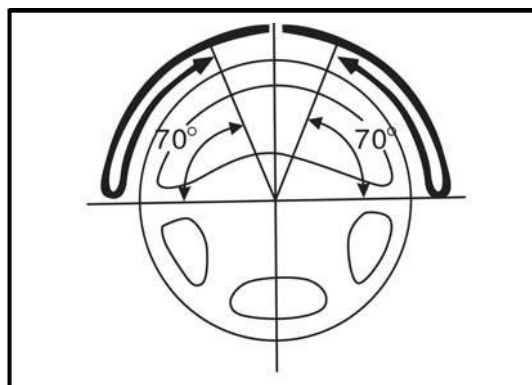
- 2). If the measured value exceeds the standard, check the installing situation of all joints of steering column and the steering assembly, and adjust or replace relevant spare parts if necessary.
- 3). If the free-running distance still exceeds 30mm, then shut down the engine and keep the front wheels straight ahead. Apply a force of 5N along the steering wheel's periphery and check the free-running distance. If the distance exceeds 10mm, then it is necessary to check whether the steering assembly is qualified.
- 4). If the distance still stays at limit, then keep the wheel straight when the engine is dead, apply a force of $4 \pm 0.6\text{N}$ along the wheel's periphery, and check the free-running distance.

Standard: <15mm

- 5). If the distance above exceeds the standard, then disassemble the steering gear and check pinion's total torque.

3. Check the middle position

- 1). Confirm whether steering gear assembly, column and wheel are installed correctly.
- 2). Carry out middle position check after the front wheels' alignment. Please refer to "front wheels' alignment"
- 3). Park the vehicle directly, and confirm the steering wheel is in the middle position.
- 4). Loosen the locknut of tie rod and turn the adjustment lever slightly, and confirm whether the steering wheel still stays at middle position.



4. Check the steering wheel's static steering force

- 1). Park the vehicle on dry and level ground, and pull up the brake handle.
- 2). Start the engine.

△Notice the tire's pressure should stay in limit

- 3). Turn the steering wheel a circle from middle position, check the wheel's steering force, and whether any apparent fluctuation exists.

steering wheel's steering force: <34N

acceptable fluctuation: <5.9N

4). If the steering force exceeds the limit, please check or adjust the following parts:

- (1). Check whether the lower suspension arm or steering tie rod's ball joint is broken
- (2). Check the steering gear's preload and the driving torque of steering tie rod
- (3). Check the driving torque of lower suspension arm's ball joint

5. Check the steering wheel's self-return

- 1). Turn the steering wheel for 90 °, and drive the vehicle in 35km/h. Keep the speed for several seconds, and loosen the steering wheel. The auto-return should be at least 70%.

△Notice During slow or sharp turn, check whether the auto-return in left and right direction is same, by using personal feeling. This check must be carried out on safe roads, and keep personal safety as priority

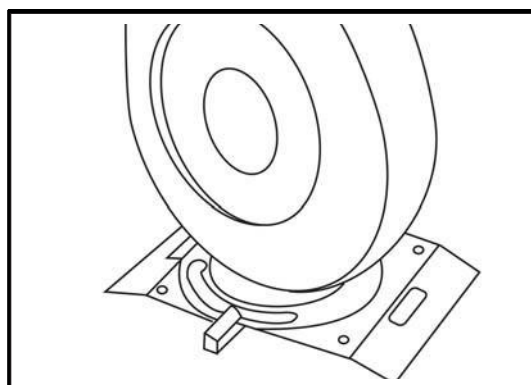
6. Check the front wheels' steering angle

- 1). After the toe-in check of front wheel, carry out steering angle check. When the vehicle is still, and engine is in idle speed, place the front wheel on steering angle measurer, and check the maximum steering angle of inner and external wheels.

Inner wheel: $35.1^{\circ} \pm 1.5^{\circ}$

External wheel: $30.6^{\circ} \pm 1.5^{\circ}$

△Notice if the measured value is not in the limit, adjust the tie rod



7. Steering angle's adjusting method

- 1). When the steering angle exceeds the limit, loosen the locknut of left and right steering tie rod, and use wrench to adjust the tie rod till the angle meets the standard. Then tighten the locknut, and the tightening torque is 45~55N.m. When re-adjust left and right tie rod, keep the left rod and right rod equal

△Notice if the inner wheel's steering angle exceeds limit, adjusting the tie rod to the outside will increase inner wheel's angle; when external wheel's steering angle exceeds limit, adjusting the tie rod to the outside will reduce external wheel's angle. The vehicle's toe-in is relevant to the adjustment of other four wheels' alignment and steering angle.

8. Check the dust cover of ball joint

- 1). Press the cover by fingers to check whether the dust cover is chap or broken
- 2). If any chap or damage exists on dust cover, replace the tie rod's ball joint immediately.

△Notice dust cover's chap or damage on surface may also cause ball joint to suffer damage.

9. Check the tie rod's ball joint

- 1). Quickly sway the tie rod for 10 times
- 2). Use spring scale to measure the swinging resistance of tie rod

Standard: 0.5~3N.m. If the measured value exceeds the limit range, replace tie rod immediately.

IV Steering wheel assembly

(I) Disassembly

1. Open the engine hood

2. Disconnect the negative cable of battery

△Notice

wait for at least 3 minutes after disconnecting the cable, in case of air bag's explosion during disassembly

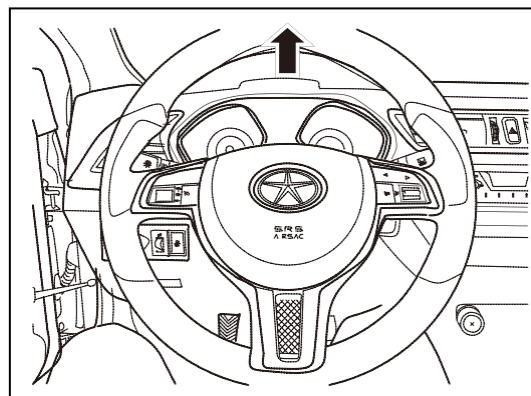
3. Dismantle driver's air bag assembly, please refer to "driver's air bag assembly"

4. Disassemble the steering wheel assembly

1). Turn the steering wheel, and make sure the front wheels are on straight line

2). Lock the steering wheel

△Notice make marks before pulling out steering wheel, and make sure the steering wheel's position after installation is the same as the one before.

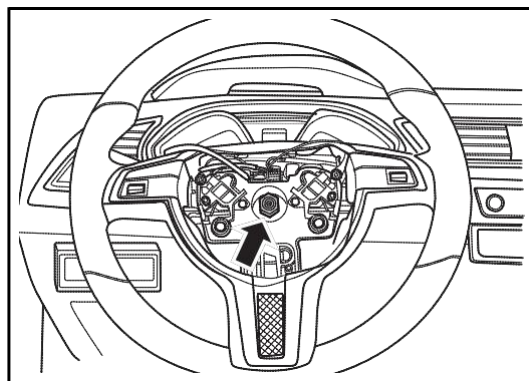


3). Loosen the fixing nut of steering wheel

4). Pull out the steering wheel from steering shaft

△Notice pre-tighten the fixing nut to steering wheel, in case of injuring maintenance personnel when pulling out the steering wheel

△Notice if the steering wheel cannot be pulled out manually, it is OK to use professional tools



(II) Installation

1. Install the steering wheel assembly

1). Turn the clock spring clockwise till the stop position, and turn it 3 circles counter-clockwise

2). Engage the steering wheel to the spline of steering column

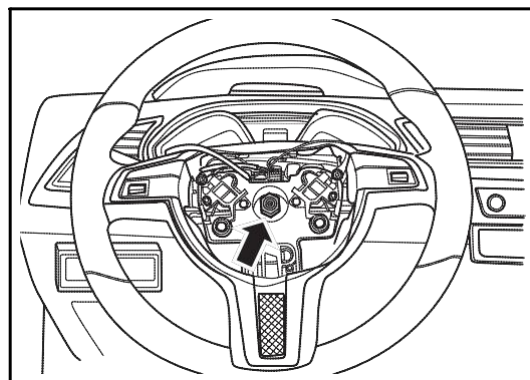
△Notice the locking slot, which is in the bottom of steering wheel, must match the locating pin of spiral cable

3). Install the fixing nut and washers

Tightening torque: 42~52N.m

4). Adjust the steering wheel's steering angle to 0

△Notice after the dismounting of steering column, the wheel's steering angle may be affected, while the pilot lamp on dashboard hasn't lighted. It is necessary to carry out steering wheel's signal calibration. After calibration, when the ignition switch is in "ON" position, EPS controller will inspect each module of the system, and light the EPS pilot lamp. If self-inspection is normal, the pilot lamp will die in 2 seconds.



2. Install driver's air bag assembly

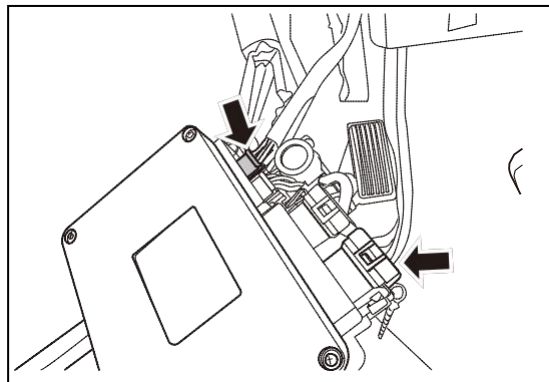
3. Connect the negative cable of battery

4. Close the engine hood

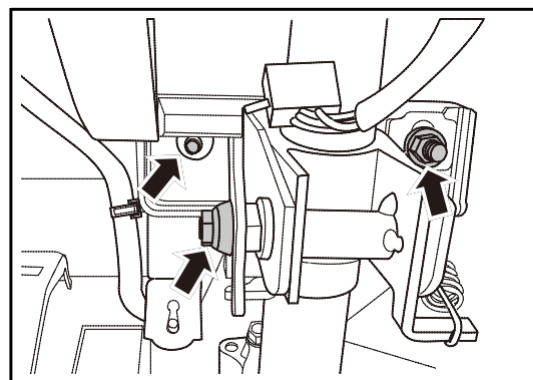
V Steering column assembly

(I) Disassembly

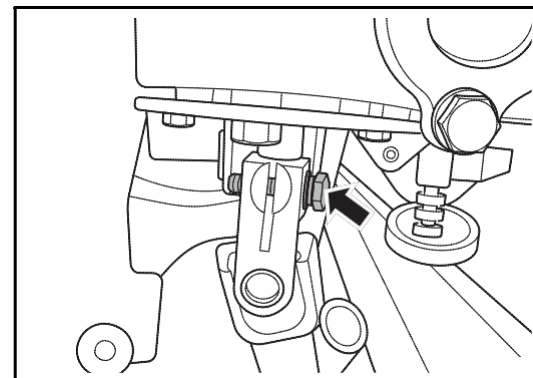
1. Open the engine hood
2. Disconnect the negative cable of battery
 - △Notice wait for at least 3 minutes after disconnecting the cable, in case of air bag's explosion during disassembly
3. Dismantle driver's air bag assembly, please refer to "driver's air bag assembly"
4. Disassemble the steering wheel assembly, please refer to "steering wheel assembly"
5. Disassemble the cladding of steering column, please refer to "cladding of steering column"
6. Disassemble the clock spring, please refer to "clock spring"
7. Dismantle the combination switch, please refer to "combination switch"
8. Dismantle the driver side's back-plate, please refer to "driver side's back-plate"
9. Disassemble the guard induction coil, please refer to "guard induction coil"
10. Dismantle the ignition lock assembly, please refer to "ignition lock assembly"
11. Disassemble the steering column assembly
 - 1). Disconnect the harness connector on steering column



- 2). Unfix the harness on steering column
- 3). Loosen the fixing bolt that connects the lower end of steering column assembly and dashboard skeleton
- 4). Loosen the two fixing bolts that connect the upper end of steering column and dashboard skeleton



- 5). Loosen the fixing bolt that connects steering column assembly and steering shaft assembly with universal shaft
- 6). Take off the steering column assembly



(II) Installation

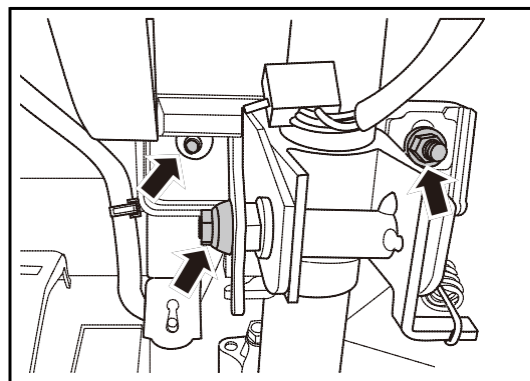
1. Install the steering column assembly

- 1). Install the fixing bolt that connects the lower end of steering column assembly and dashboard skeleton

Tightening torque 20~30N.m

- 2). Install the two fixing bolts that connect the upper end of steering column assembly and dashboard skeleton

Tightening torque 20~25N.m



VI Steering shaft assembly with universal shaft

(I) Disassembly

1. Open the engine hood

2. Disconnect the negative cable of battery

△Notice wait for at least 3 minutes after disconnecting the cable, in case of air bag's explosion during disassembly

3. Dismantle driver's air bag assembly, please refer to "driver's air bag assembly"

4. Disassemble the steering wheel assembly, please refer to "steering wheel assembly"

5. Disassemble the cladding of steering column, please refer to "cladding of steering column"

6. Disassemble the clock spring, please refer to "clock spring"

7. Dismantle the combination switch, please refer to "combination switch"

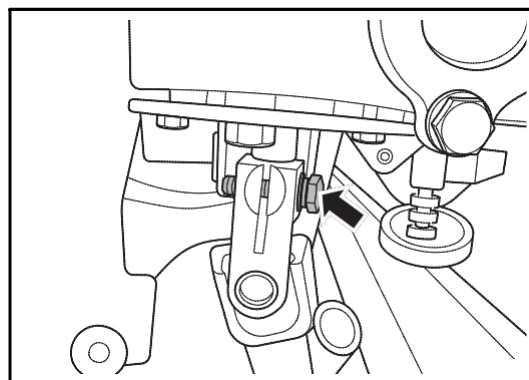
8. Dismantle the driver side's back-plate, please refer to "driver side's back-plate"

9. Disassemble the guard induction coil, please refer to "guard induction coil"

10. Dismantle the ignition lock assembly, please refer to "ignition lock assembly"

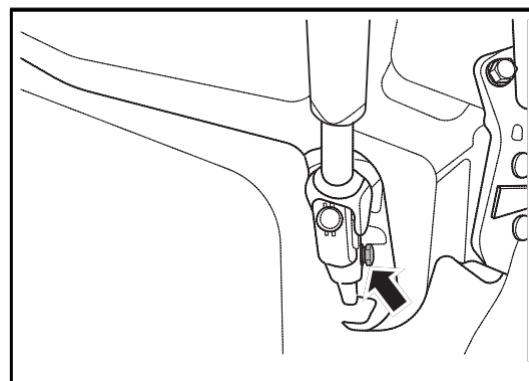
11. Disassemble the steering shaft assembly with universal shaft

- 1). Loosen the fixing bolt that connects steering column and steering shaft



- 2). Loosen the fixing bolt that connects steering shaft and steering gear

- 3). Take off the steering shaft assembly with universal joint

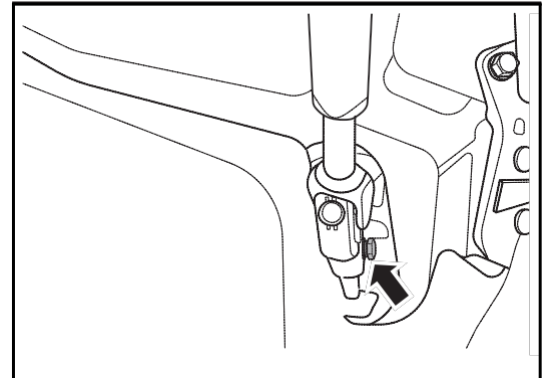


(II) Installation

1. Install the steering shaft assembly with universal joint

- 1). Tighten the fixing bolt that connects steering shaft and steering gear

Tightening torque 30~35N.m

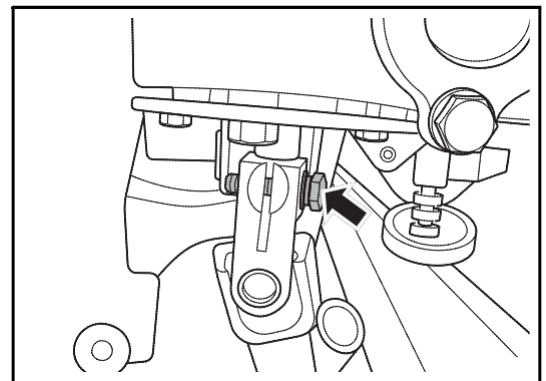


- 2). Tighten the fixing bolt that connects steering column assembly and steering shaft assembly

Tightening torque: 30~35N.m

- 3). Adjust the steering wheel's steering angle to 0

△Notice after the dismounting of steering column, the wheel's steering angle may be affected, while the pilot lamp on dashboard hasn't lighted. It is necessary to carry out steering wheel's signal calibration. After calibration, when the ignition switch is in "ON" position, EPS controller will inspect each module of the system, and light the EPS pilot lamp. If self-inspection is normal, the pilot lamp will die in 2 seconds.

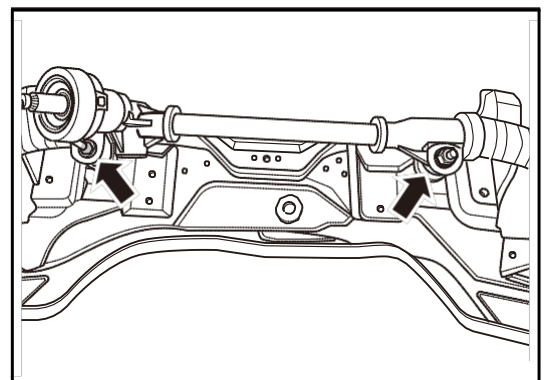


2. Install the guard induction coil
3. Install the driver-side back-plate
4. Install the combination switch
5. Install the clock spring
6. Install the steering wheel assembly
7. Install the cladding of steering column
8. Install the driver's air bag assembly
9. Connect the negative cable of battery
10. Close the engine hood

VII Steering gear assembly

(I) Disassembly

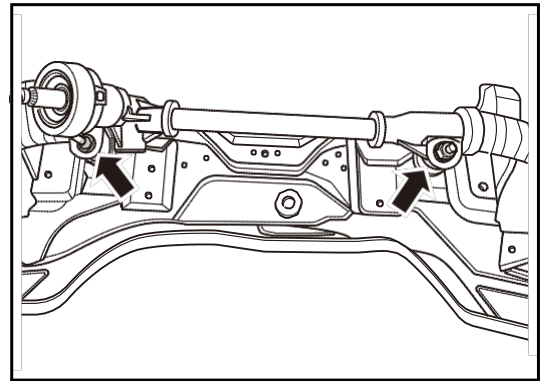
1. Disassemble the left-front wheel, please refer to "wheels"
2. Disassemble the right-front wheel, please refer to "wheels"
3. Dismantle left-lower suspension arm assembly, please refer to "lower suspension arm"
4. Dismantle right-lower suspension arm assembly, please refer to "lower suspension arm"
5. Dismantle the front sub-frame assembly with stabilizer bar and steering gear, please refer to "front sub-frame"



assembly”

6. Disassemble the steering gear assembly

- 1). Disassemble the two hex flange-face nuts and two gear locknuts that connect gear assembly and front subframe
- 2). Take off the steering gear assembly



(II) Installation

1. Install the steering gear assembly

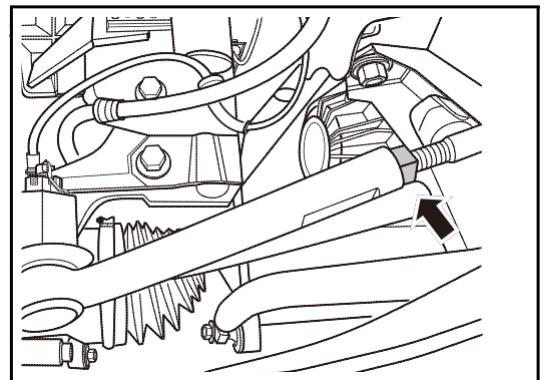
- 1). Put the gear assembly on the installing position of front sub-frame
 - 2). Install the two hex flange-face nuts and two gear locknuts that connect gear assembly and front sub-frame
- Tightening torque 95~105N.m

3). Adjust the tie rod's left and right length according to the value before maintenance, and tighten the locknut after the adjustment.

Tightening torque 45~55N.m

4). Adjust the steering wheel's steering angle to 0

△Notice after the dismantling of steering column, the wheel's steering angle may be affected, while the pilot lamp on dashboard hasn't lighted. It is necessary to carry out steering wheel's signal calibration. After calibration, when the ignition switch is in "ON" position, EPS controller will inspect each module of the system, and light the EPS pilot lamp. If self-inspection is normal, the pilot lamp will die in 2 seconds.



2. Install the front sub-frame assembly with stabilizer bar and steering gear
3. Install the right lower suspension arm assembly
4. Install the left lower suspension arm assembly
5. Install the right-front wheel
6. Install the left-front wheel