

1. Note

A: BASIC REPAIR HINT

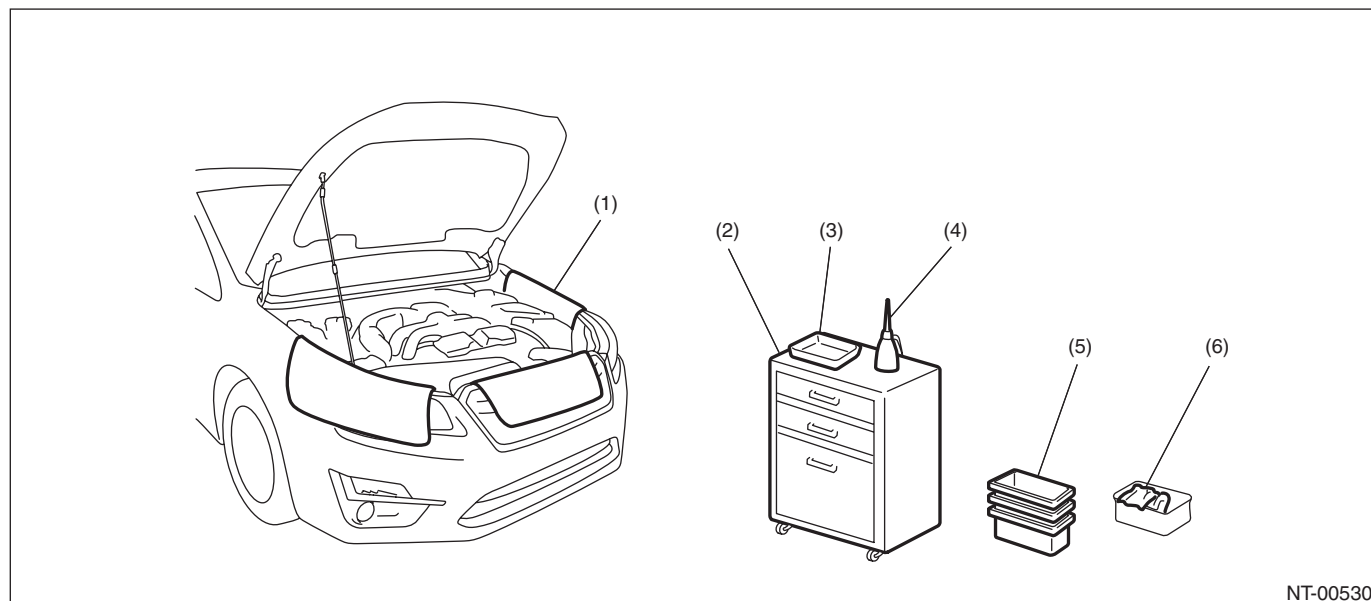
This section describes basic points that the service operator must understand before performing the service operation.

1. APPEARANCE

- Always wear clean work clothing.
- Wear a cap and protective shoes.

2. PROTECTION OF VEHICLE UNDER MAINTENANCE AND PREPARATION OF TOOLS/ EQUIPMENT

- Before work, cover the vehicle body. (Ex. grille cover, fender cover, seat cover and floor mat cover)
- Before performing the service operation, prepare tools, equipment, container box, grease and cloth etc.



NT-00530

- (1) Fender cover
- (2) Tools/equipment case

- (3) Tray
- (4) Oil

- (5) Container box
- (6) Cloth

3. SAFETY

- Before work, set the wheel stoppers to secure the vehicle.
- When performing work by multiple workers, call to each other to make sure that service operation is performed safely.
- Ventilate the room when starting the engine.
- When performing the service operation of high-temperature parts like muffler, or rotating parts like fan and other movable parts, be careful not to get burned or injured.
- For the jack-up and lift up, set the tool to the proper location to support the vehicle correctly. And use the safety device properly when lifting up.
- When touching the power cables, wear insulation protectors.

4. SERVICE OPERATION

- By identifying the vehicle problems thoroughly before work, service operation will be performed effectively.
- Before removing parts, confirm the installation condition or the damage of the parts.
- To reinstall parts properly, leave a note of the condition before work as necessary.
- For a part which needs positioning, take appropriate action such as putting alignment marks.
- For a removed part, clean it as necessary and check for damage and defect before installation. If the part is damaged or defective, replace it with a new part.
- Removing or installing the components or the connectors with the ignition switch ON will electrically impair them.

5. REMOVED PART

- A removed part must be organized to avoid mixing up with similar parts. When same parts are used in multiple locations, such as pistons in engine, manage the parts by using labels with cylinder No. so that the parts are not installed to the wrong location.
- Always replace nonreusable parts such as gasket and O-ring with new parts.
- After work, have a customer confirm the replaced part.

6. WHEN REMOVING BATTERY

When removing battery, power supply is cut off and the information stored in the computer memory is volatilized. Therefore, setting information of some device is initialized to the factory default. The device and functions initialized by removing battery are as follows.

No.	Item	Job contents when connecting battery
1	Clock (MFD) (settings that the customer set)	Set the clock to the current time.
2	MFD (high grade type)	Set to the contents checked before disconnecting the battery.
3	Audio (settings that the customer set)	Set to the contents checked before disconnecting the battery.
4	Navigation system (settings that the customer set)	<ul style="list-style-type: none"> • Time setting is not necessary because the time information is received via GPS. • Set the sound and other settings (items that were set in the selection) to the contents checked before disconnecting the battery.
5	Temperature setting of fully automatic air conditioner (settings that the customer set)	Set to the contents checked before disconnecting the battery.
6	Power window system	Initialize automatic full open/close of driver's window (power window system). For the initialization procedure, refer to "GW" section. <Ref. to GW-10, OPERATION, Power Window System.>
7	Steering lock system (model with keyless access)	If the engine does not start, initialize the steering lock system. For the initialization procedure, refer to "KPS" section. <Ref. to KPS(diag)-142, ENGINE DOES NOT START, INSPECTION, Diagnostics with Phenomenon.>
8	EyeSight (model with EyeSight)	Set to the contents checked before disconnecting the battery.
9	Electronic throttle system	Turn the ignition switch to ON, wait for 10 seconds or more, and start the engine.
10	Engine control system	Let the engine run at idle until it fully warms up (the radiator fan turns 2 times or more) under no electrical load condition.
11	Past trouble history (memory code)	—
12	Brake stroke sensor learning value (HEV model)	Connect the Subaru Select Monitor and read the diagnostic trouble codes (DTC). If any diagnostic trouble code (DTC) is displayed, refer to "List of Diagnostic Trouble Code (DTC)" in "HYBRID ELECTRIC VEHICLE (DIAGNOSTICS)" section. <Ref. to HEV(diag)-74, List of Diagnostic Trouble Code (DTC).>
13	Active grille shutter system	Perform active test to close the shutter. For procedures, refer to EN(H4DO HEV)(diag). <Ref. to EN(H4DO HEV)(diag)-67, OPERATION, System Operation Check Mode.>

Note

NOTE

7. OTHER ADJUSTMENT OPERATIONS BEFORE DELIVERING THE VEHICLE TO CUSTOMER

Due to service and parts replacement convenience, perform the following operations before delivering the vehicle to the customer.

No.	Item	Check operation	Adjustment operation	Additional adjustment operations when replacing parts
1	Positions of devices <ul style="list-style-type: none"> Steering Room mirror Door mirror Seat Air conditioner vent grille 	Is the device set to the same position when the vehicle was received from the customer?	Adjust the device to the similar position when the vehicle was received from the customer.	When removing/installing each device <ul style="list-style-type: none"> Meter, instrument panel, steering column, etc. Room mirror, roof trim, sunroof assembly, etc. Door mirror, door panel, etc. Seat, floor carpet, parking brake lever, etc. Vent grille, instrument panel, console box, etc.
2	Positions of switches <ul style="list-style-type: none"> SI-Drive Wiper, light (AUTO or OFF) Headlight beam leveler Illumination control Room light Seat heater, etc. 	Is the switch set to the same position when the vehicle was received from the customer?	Set the switch to the same position when the vehicle was received from the customer.	When removing/installing each switch
3	Position of antenna	Is the antenna set to the same position when the vehicle was received from the customer?	Adjust the position of antenna.	When removing/installing the antenna and washing the vehicle

B: NOTE

This is the information that can improve the efficiency of maintenance and assure the sound work.

1. CLEANING

- Perform the operation in a clean location and use extra caution in dust proofing.
- Clean the items (except for assembly components) with steam, etc. before disassembly. During steam cleaning, wrap the air breather, oil level gauge, connectors, etc. with vinyl tape to prevent steam from entering inside the parts.
- Use an appropriate cleaning solvent.
- Do not clean rubber parts such as O-ring, gasket and oil seal with cleaning solution.

2. FASTENERS NOTICE

Tighten the bolts and nuts to the specified torque.

Do not apply paint, lubricant, rust retardant or other substance to the surface around bolts, nuts, etc. It may cause troubles with tightening to the specified torque and result in looseness and other problems of bolts and nuts.

3. ABOUT SCREWS

Use an appropriate sized tool. Insert a screw vertically into the hole. Check for any loose screws after installation.

If improper tools are used or screws are inserted obliquely to the hole, the screws cannot be installed correctly, which may result in insufficient tightening force or damage on the hole.

4. STATIC ELECTRICITY DAMAGE

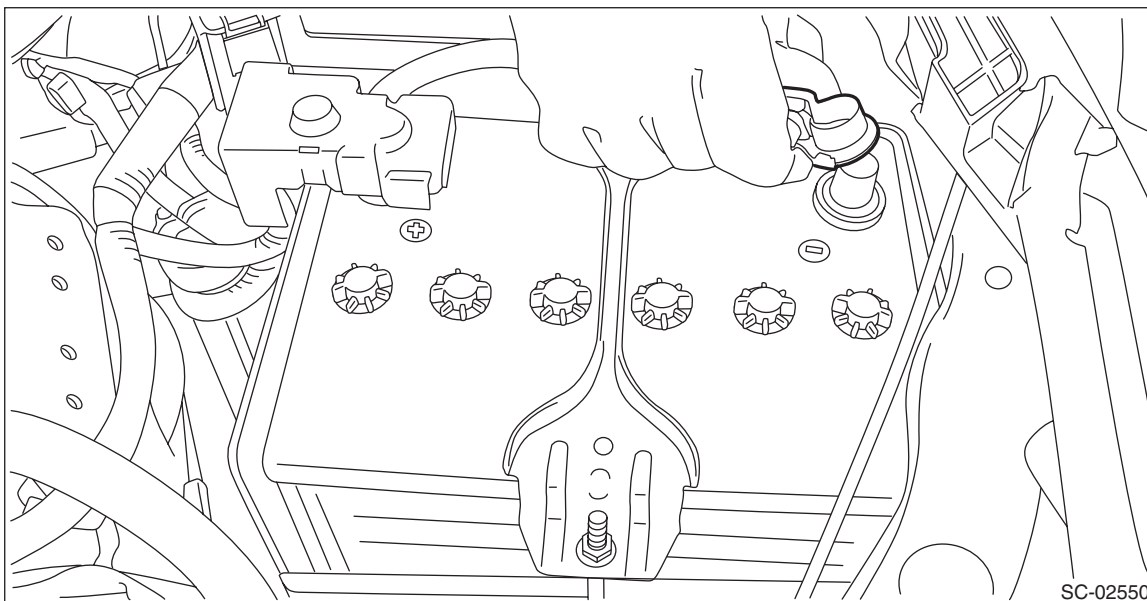
Do not touch the control modules, connectors, logic boards and other such parts when there is a risk of static electricity. Always use a static electricity prevention cord or touch grounded metal for the elimination of static electricity before conducting work.

5. BATTERY

When removing the battery terminal, always be sure to turn the ignition switch to OFF and disconnect the battery ground terminal first.

1. Gasoline engine model

- Disconnect the ground cable from battery.



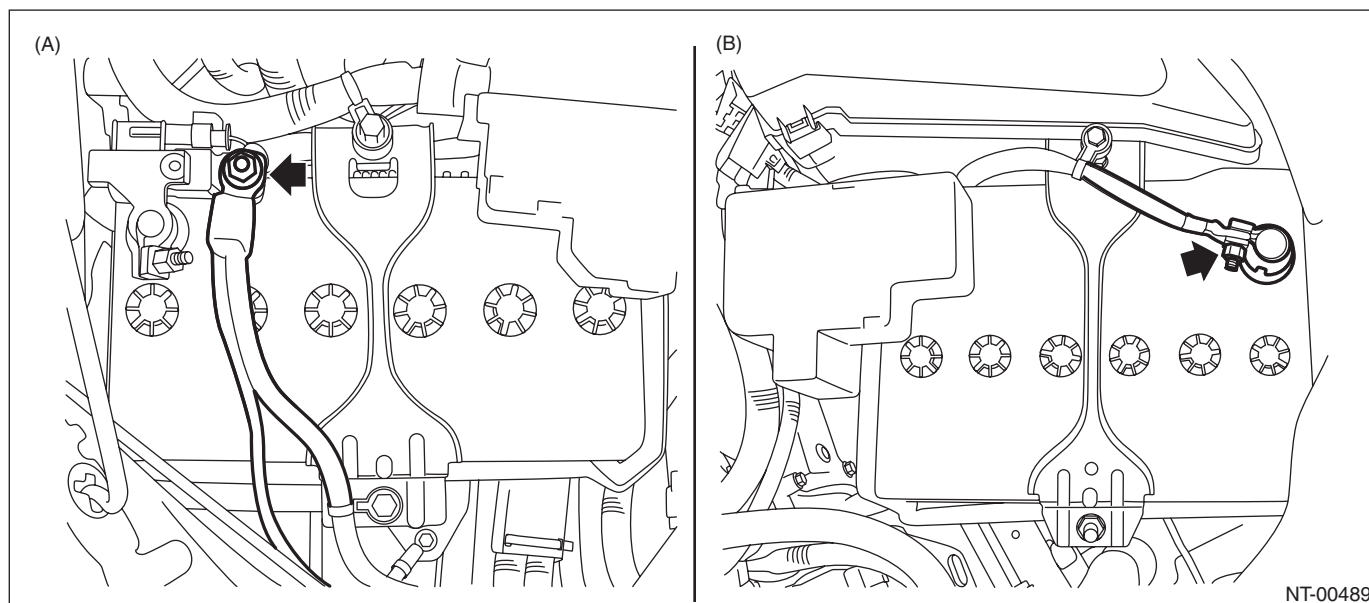
- Install in the reverse order of removal.

NOTE:

- Clean the battery cable terminals and apply grease to retard the formation of corrosion.
- Connect the positive (+) terminal, and then connect the negative (-) terminal of the battery.
- After the battery is installed, initial diagnosis of the electronic throttle control is performed. Wait for 10 seconds or more after turning the ignition switch to ON, and then start the engine.

2. HEV model

- After disconnecting the negative terminal from 12 volt auxiliary battery, disconnect the ground terminal from 12V engine restart battery sensor for 12 volt engine restart battery.



(A) 12 volt engine restart battery

(B) 12 volt auxiliary battery

Note

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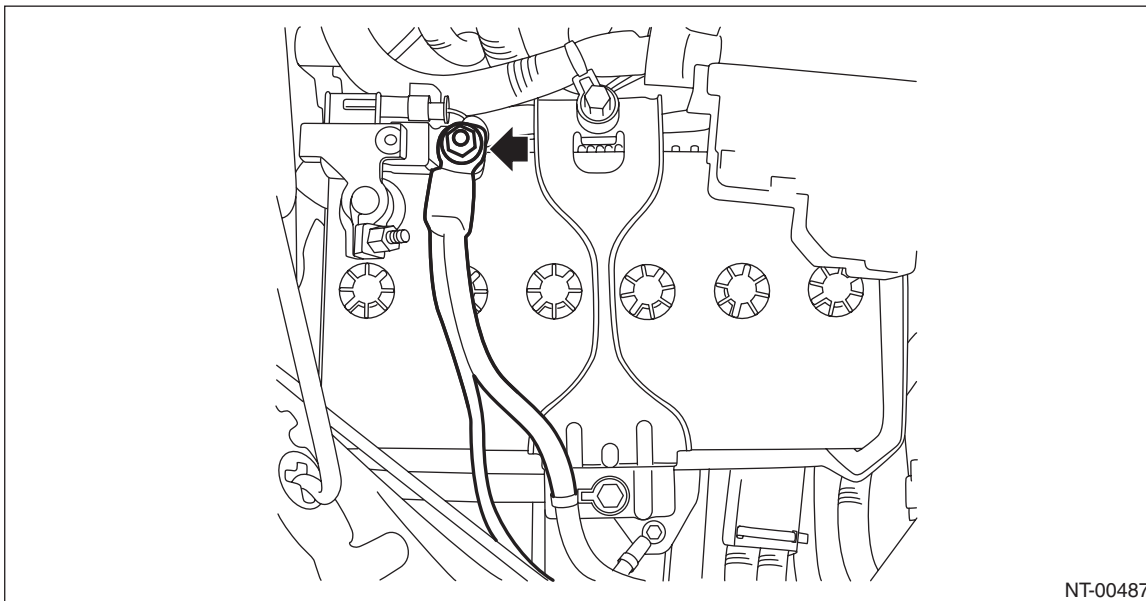
- Install in the reverse order of removal.

NOTE:

- Install the 12V engine restart battery sensor while holding it with your hand to prevent the sensor from turning.
- Clean the battery cable terminals and apply grease to retard the formation of corrosion.
- Connect the positive (+) terminal, and then connect the negative (–) terminal of the battery.
- After connecting the battery ground terminal, the following operations are automatically performed in the vehicle.
 - Initial diagnosis of electronic throttle control
 - Learning control of brake pedal stroke sensorTherefore, before starting the engine, be sure to place the select lever in “P” position, turn the ignition switch to ON, and wait at least 10 seconds without depressing the brake pedal.
 - Initialization operation of active grille shutterDo not place your hand, cloth, tools or other items nearby, because the active grille shutter opens approximately four seconds after the battery installation.

Tightening torque:

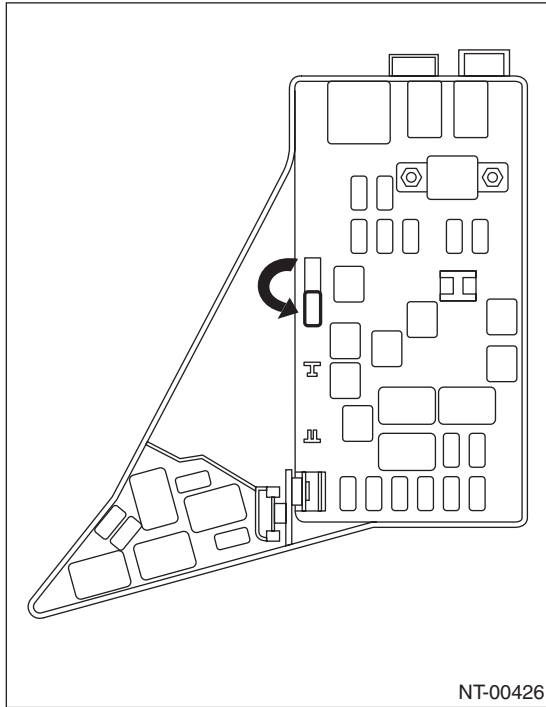
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



NT-00487

6. BACKUP/POWER SUPPLY FUSE

Backup fuse (20A) remains removed to prevent the battery consumption when vehicles are delivered. Install the backup fuse by following the illustration.



7. IMMOBILIZER RELATED PART

- Do not replace the immobilizer related parts with the parts from other vehicle.
- Registration of the immobilizer is necessary when a immobilizer-related control module has been replaced. For detailed operation procedure, refer to the "REGISTRATION MANUAL FOR IMMOBILIZER".

8. SERVICE PARTS

Use genuine parts for maximum performance and maintenance when conducting repairs. Subaru/FHI will not be responsible for poor performance resulting from the use of parts except for genuine parts.

9. PROTECTING VEHICLE UNDER MAINTENANCE

Make sure to attach the fender cover, seat covers, etc. before work.

10. ENSURING SECURITY DURING WORK

When working in a group of two or more, perform the work with calling each other to ensure mutual safety.

11. LIFT AND JACK

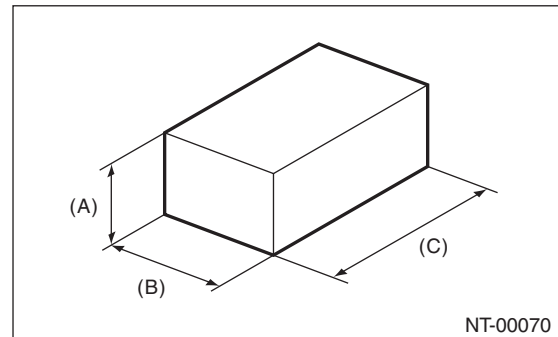
When using a lift or shop jack to raise a vehicle or using rigid rack to support a vehicle, always follow instructions concerning jack-up points and weight limits to prevent the vehicle from falling, which could result in injury. Be especially careful that the vehicle is balanced before raising it. Be sure to set the wheel stoppers when jacking-up only the front or rear side of the vehicle.

CAUTION:

Select the lift attachment so that the side sill does not contact the lift arm.

NOTE:

- When using a lift, follow its operation manual.
- When the side sill cover contacts the lift arm, use a lift attachment.
- Do not work or leave unattended while the vehicle is supported with jack, support it with rigid racks.
- Be sure to use the rigid racks with rubber attached to cradle to support the vehicle.
- When using a lift, use an attachment or something similar.
- When using a plate lift, use a rubber attachment. Place the attachment to the specified position of the vehicle, by adjusting front/rear and left/right sides accordingly.



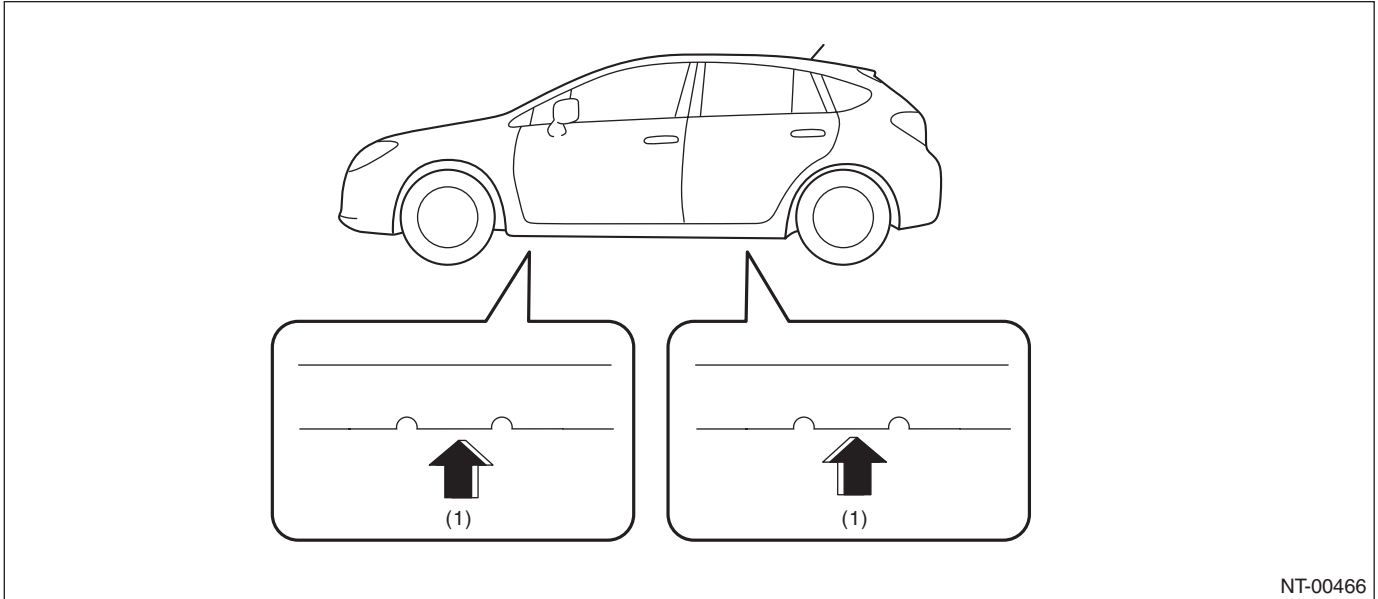
- (A) 80 mm (3.1 in) or more
- (B) 80 — 100 mm (3.15 — 3.94 in)
- (C) 120 — 200 mm (4.72 — 7.87 in)

- Align the cushion rubber center part of plate lift with the center part of rubber attachment.
- Do not use the plate lift whose attachment does not reach the supporting locations.

Note

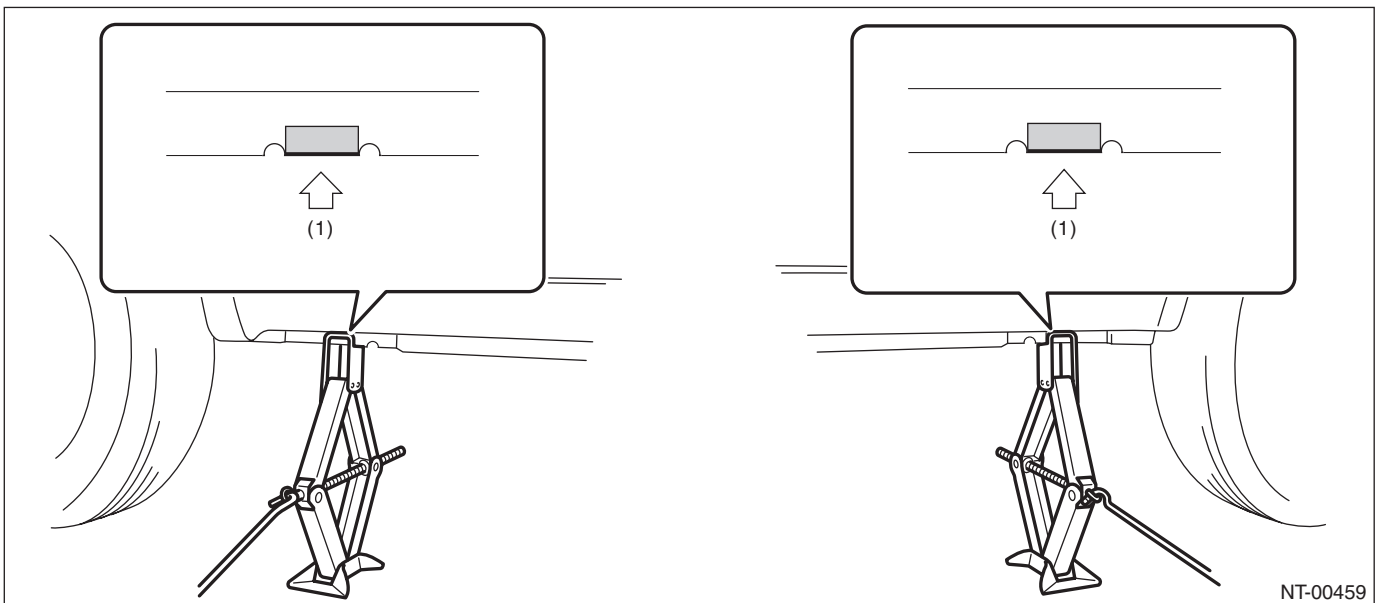
NOTE

- **Support locations**



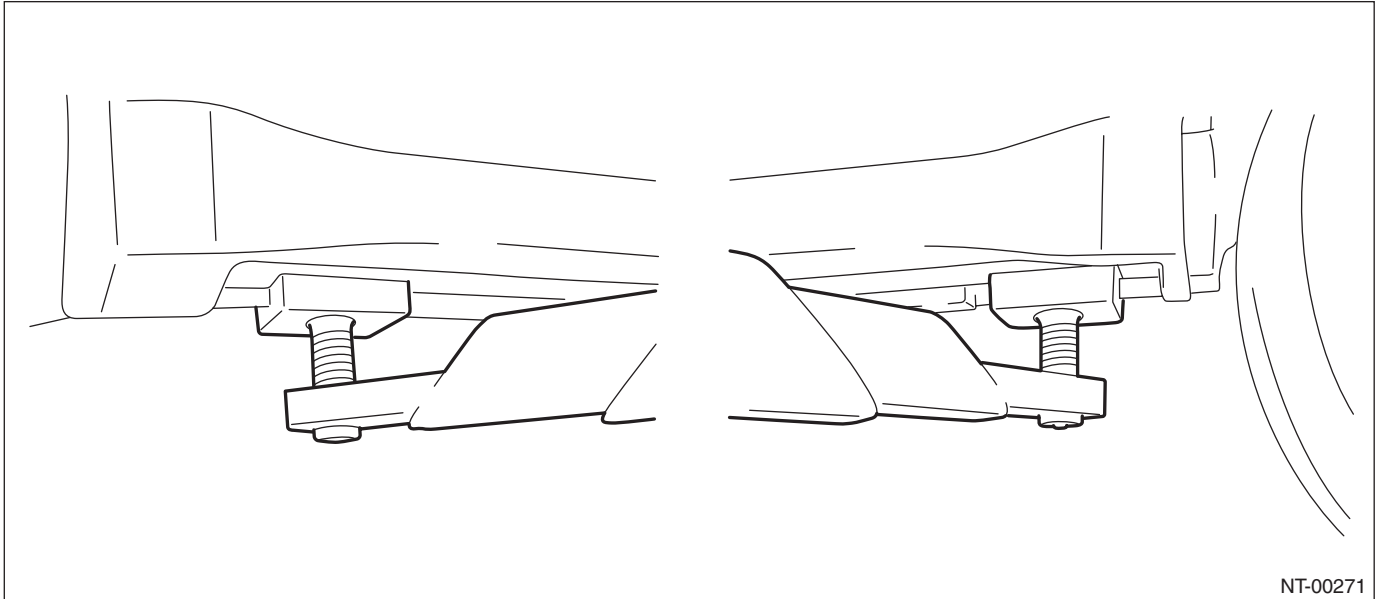
(1) Jack-up point

- **Pantograph jack**



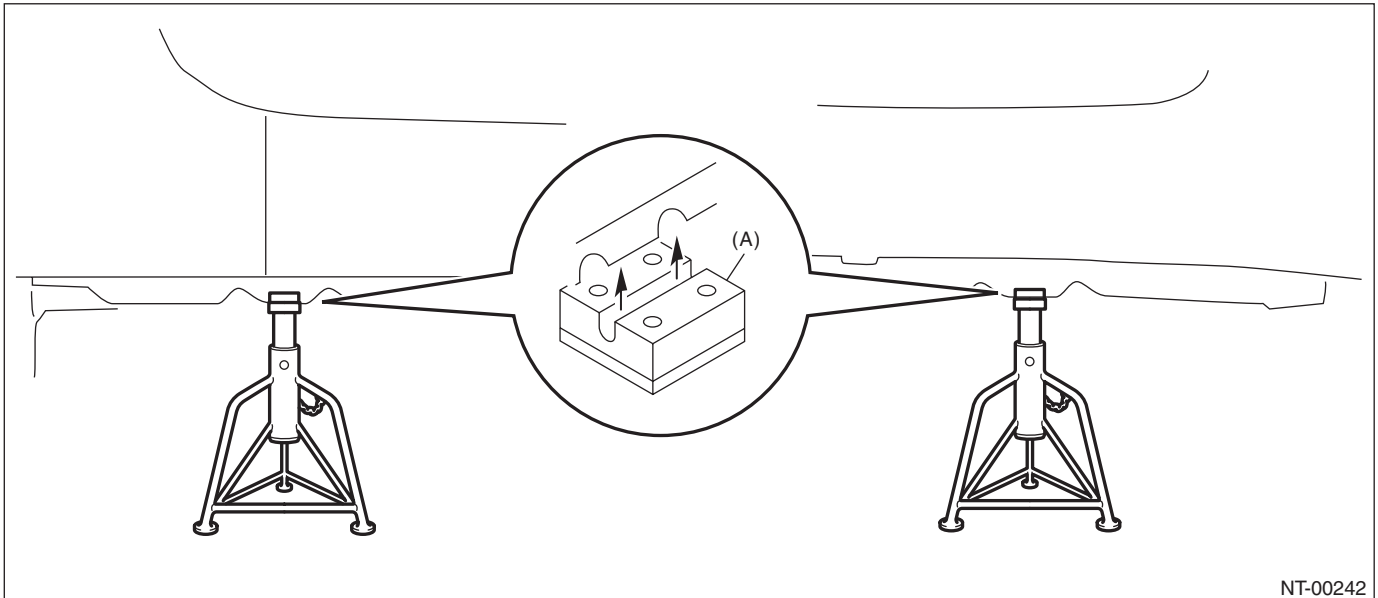
(1) Jack-up point

- Lift

**CAUTION:**

For models with side garnish, use a spacer or an attachment to lift up the vehicle securely at jack up point without the side garnish contacting the lift.

- Rigid rack

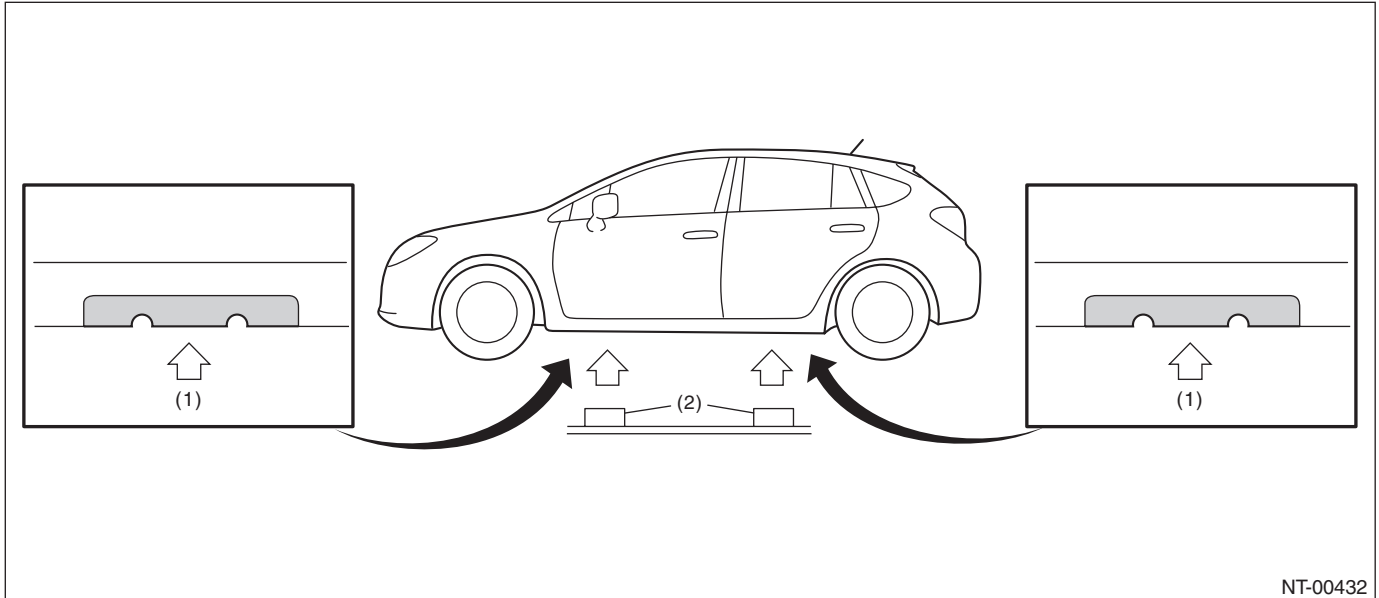


(A) Attachment

Note

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• Plate lift

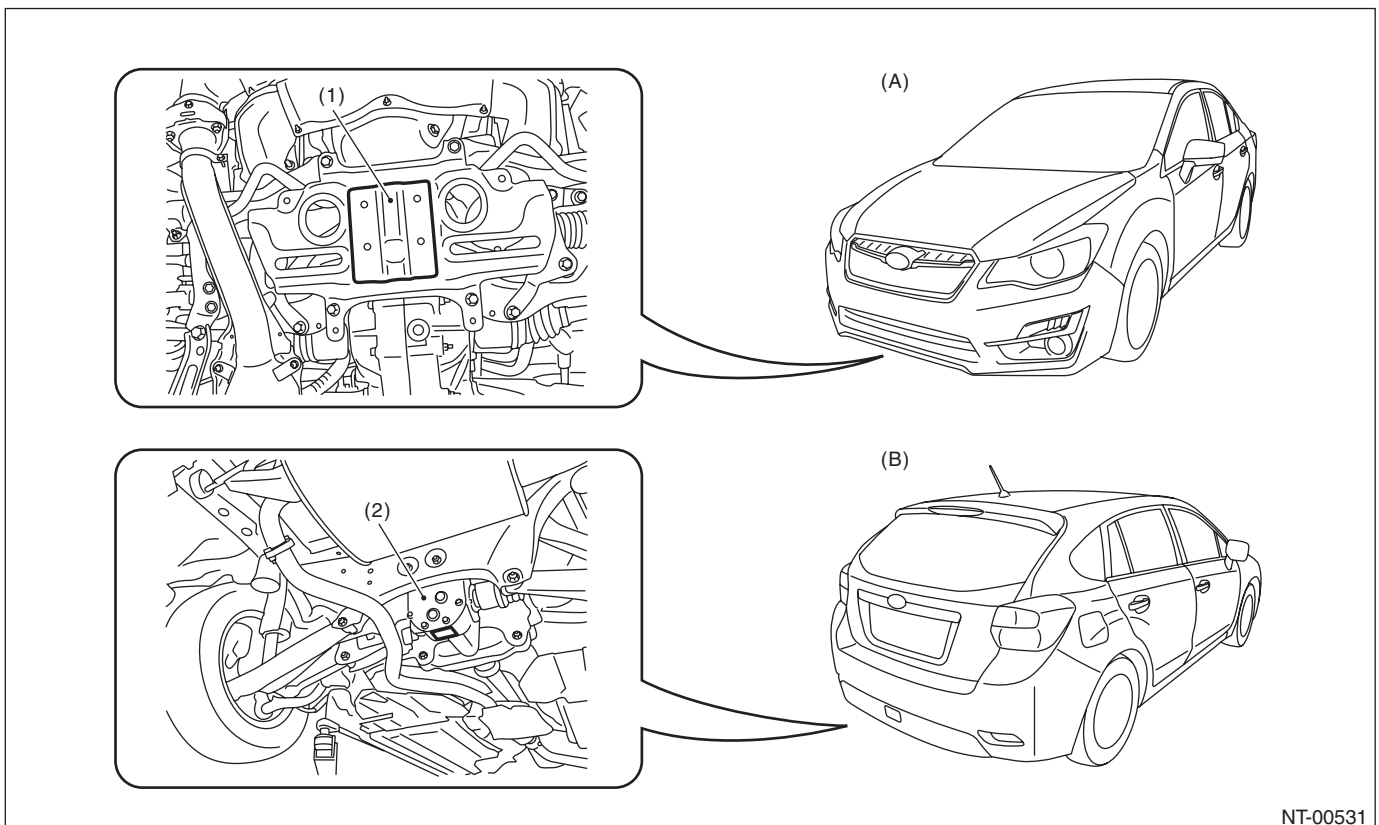


NT-00432

(1) Jack-up point

(2) Attachment

• Jack-up point (when using a garage jack)



NT-00531

(A) Front

(B) Rear

(1) Front crossmember

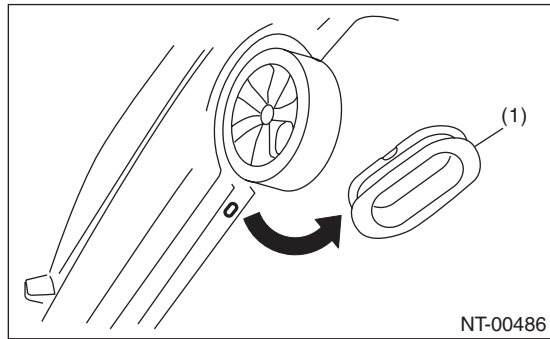
(2) Rear differential

CAUTION:

If jacking up the front side of the vehicle, make sure that the jack is attached at the center of the jack-up plate not at the sides.

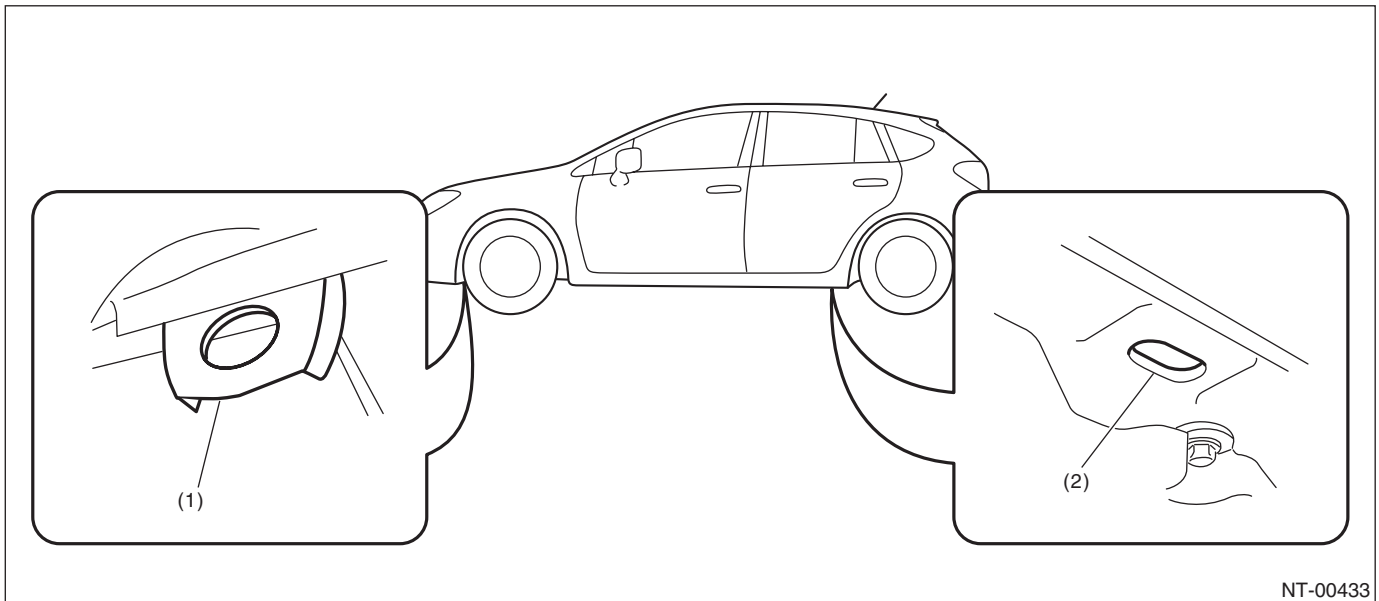
12.TIE-DOWNS

Tie-downs are used when transporting vehicles and when using the chassis dynamo. Remove the grommet of the tie-down hole and install the tie-down only to the specified locations on the vehicle.



(1) Grommet

• Tie-down location



(1) Hook for tie-down

(2) Tie-down hole

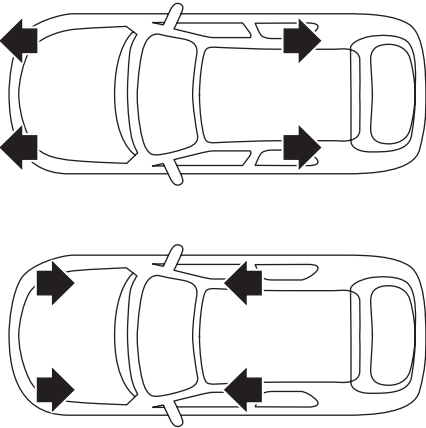
Note

NOTE

- Chain direction at tie-down condition

CAUTION:

- Pull the front and rear of the vehicle in the opposite direction, and pull the left and right of the vehicle in the same direction.
- Patterns except for the followings (recommended) are not allowed.

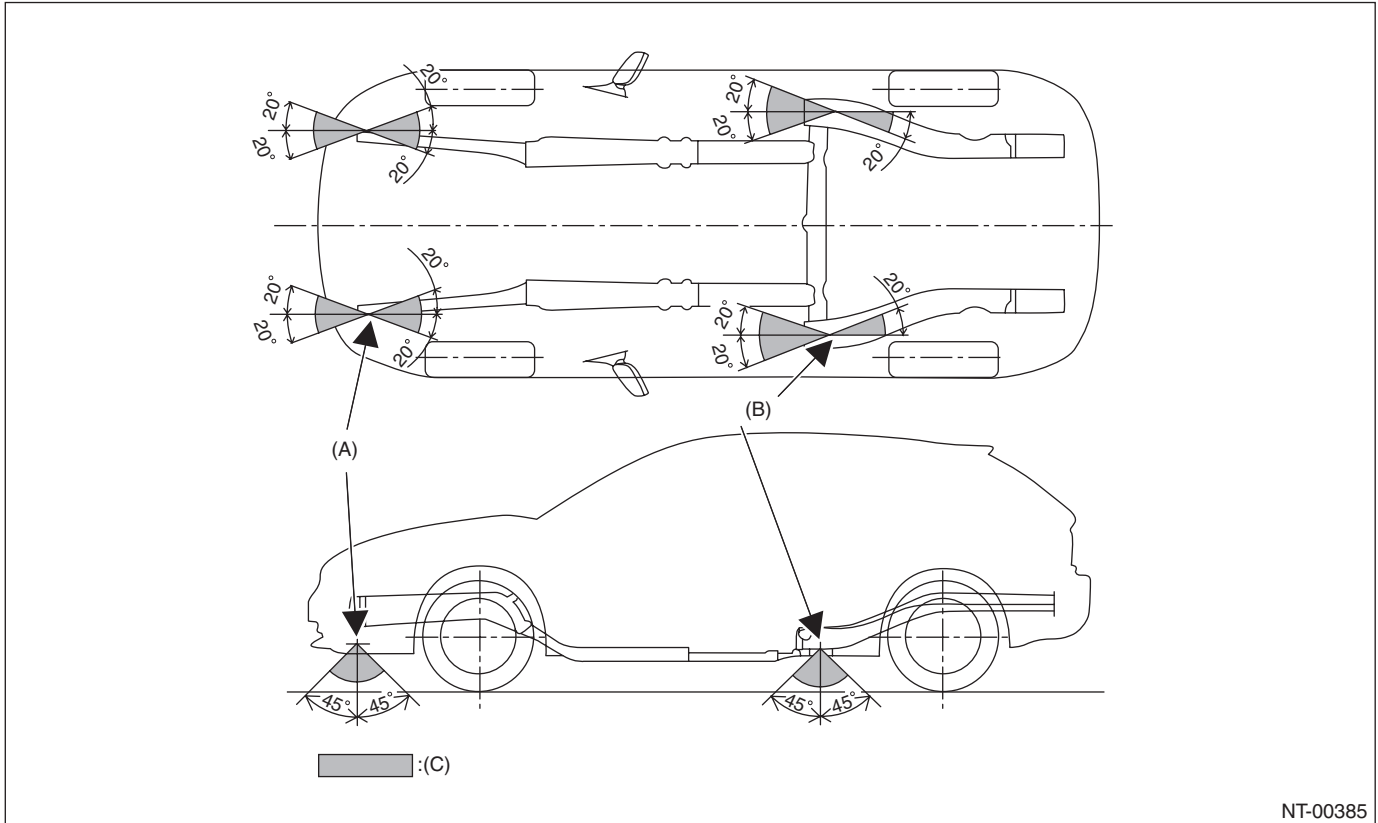
	Recommended
Tie-down direction	 NT-00214

- Tie-down range

For ground transportation

CAUTION:

When the vehicle is tied down from vehicle inside, hook the hooks of tie-down chain on the rear tie-down holes from vehicle inside. When the vehicle is tied down from vehicle outside, hook the hooks of tie-down chain on the rear tie-down hooks from vehicle outside.



NT-00385

(A) Front tie-down hook

(B) Rear tie-down hole

(C) Chain pulling range at tie-down condition

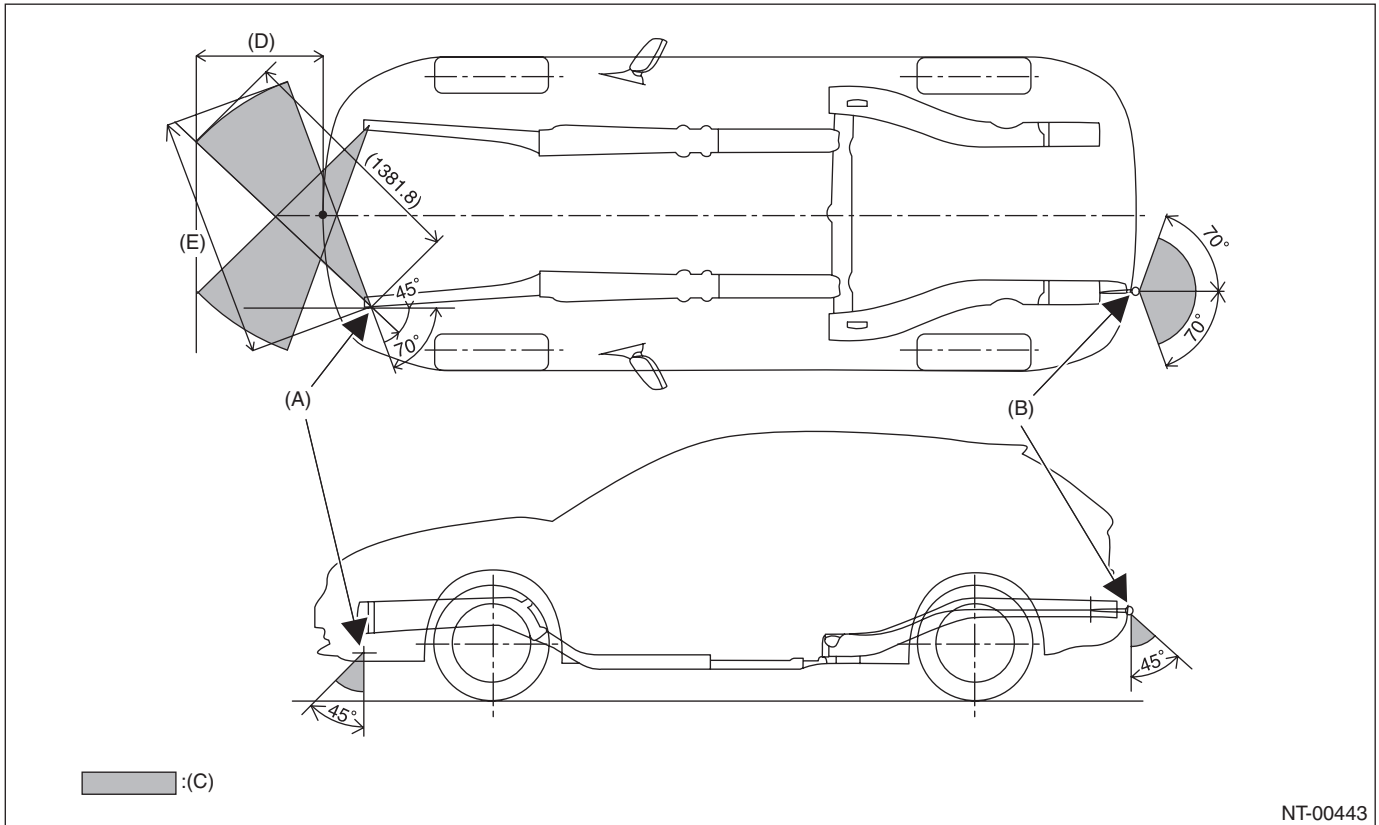
Note

NOTE

For sea transportation

CAUTION:

The eyebolts are exclusively used for towing and sea transportation tie-down, and do not use them for ground and freight transportation.



NT-00443

- | | | |
|-------------------------|---|------------------------|
| (A) Front tie-down hook | (C) Chain pulling range at tie-down condition | (E) 1,320 mm (52.0 in) |
| (B) Eyebolt | (D) 400 mm (15.7 in) | |

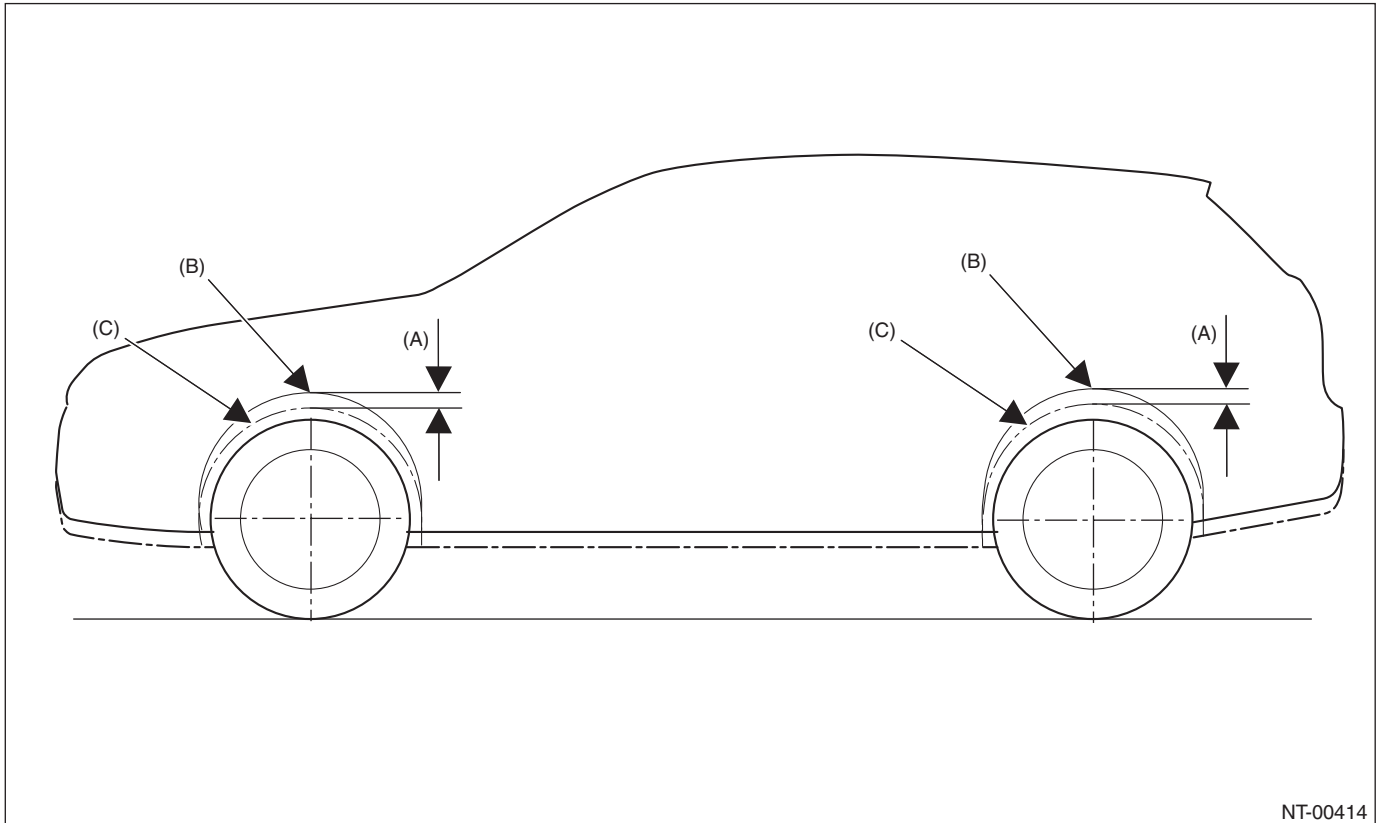
- Vehicle sinking volume at tie-down condition

CAUTION:

The vehicle sinking volume at tie-down condition should be less than 50 mm (1.97 in) and make sure to fix the vehicle securely.

Check to see if the tensions of chains or belts at tie-down condition are appropriate in the following procedures.

- 1) Before tie-down, measure the distance between the highest tire point and highest arch point at the center of wheel.
- 2) After tie-down, measure the distance between the highest tire point and highest arch point at the center of wheel.
- 3) If the distance (A) between the measured value of 1) and 2) above, is less than 50 mm (1.97 in), it is judged as OK. If the distance is 50 mm (1.97 in) or more, it is judged as NG because the tension is too high.



(B) Arch position before tie-down

(C) Arch position after tie-down

- Notes for the use of tie-down hook

When the vehicle is tied down from vehicle inside, hook the hooks of tie-down chain from vehicle inside, and when the vehicle is tied down from vehicle outside, hook the hooks of tie-down chain from vehicle outside. For front tie-down hook, use S hook and J hook, and for rear tie-down hole, use S hook, J hook and T hook. T hook can be used only for rear tie-down hole.

NOTE

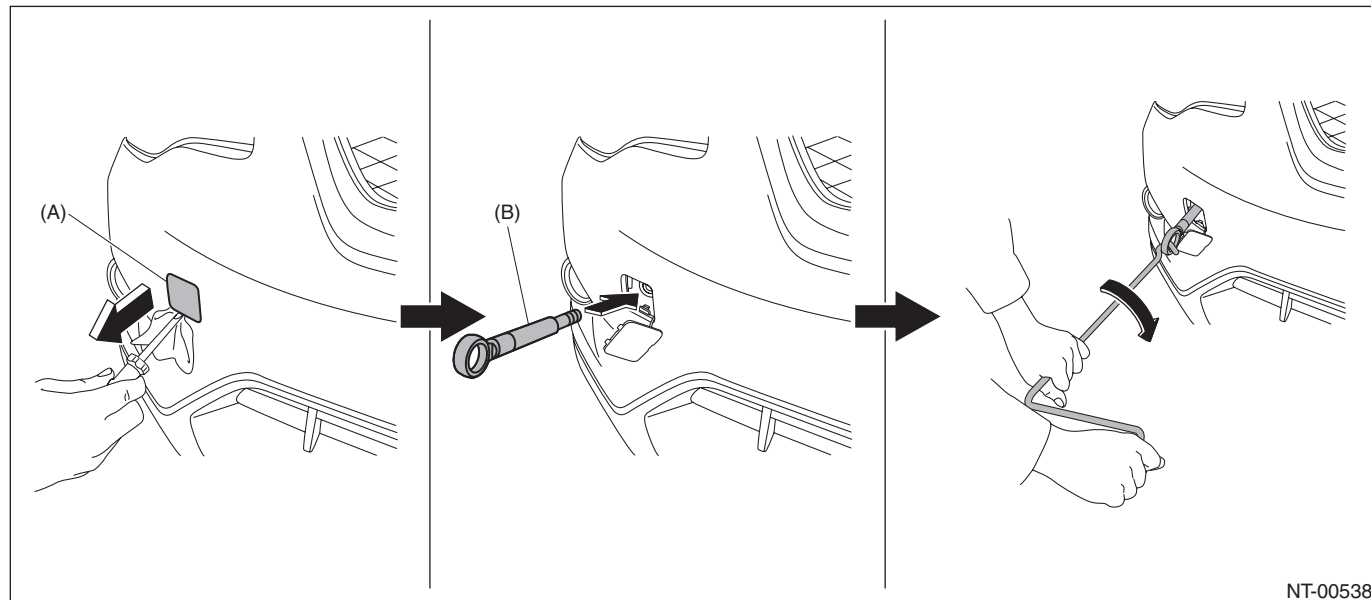
13.TOWING

Avoid towing vehicles except when the vehicle cannot be driven. For models with AWD, CVT or VTD, use a loader instead of towing. When towing other vehicles, pay attention to the following to prevent hook or vehicle damage resulting from excessive weight.

- Do not tow other vehicles with a front tie-down hook.
- Make sure the vehicle towing is heavier than the vehicle being towed.
- When towing the vehicle equipped with Subaru EyeSight, be sure to hold down the pre-collision brake OFF switch to turn OFF the pre-collision brake function. (Check that the pre-collision brake OFF indicator light in the meter lights up.)

- Front

Remove the hook cover, and install the towing hook (eyebolt).

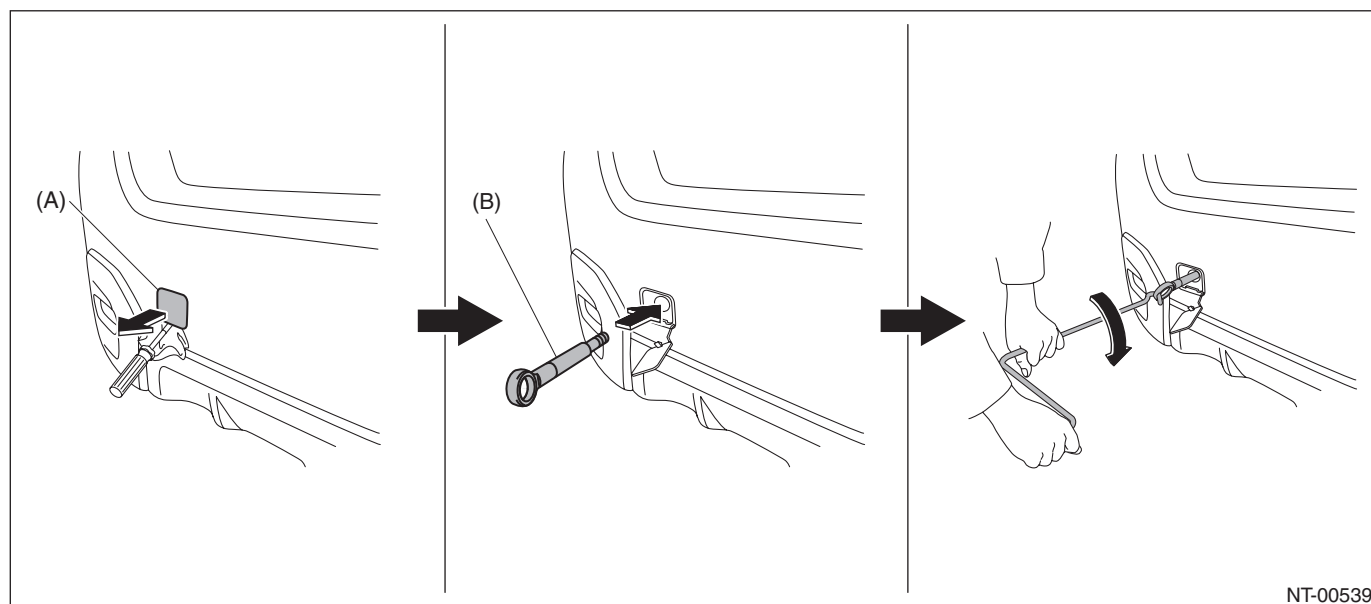


(A) Hook cover

(B) Towing hook (eyebolt)

- Rear

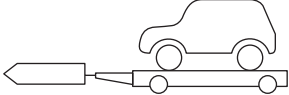

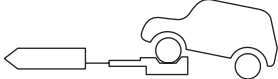

Remove the hook cover, and install the towing hook (eyebolt).



(A) Hook cover

(B) Towing hook (eyebolt)

• Precautions

Towing	Precautions	MT	CVT
<p>Lifting up four wheels (on a trailer)</p>  <p>NT-00023</p>	<p>Towing the vehicle after lifting up all four wheels is a basic rule for AWD model.</p>	○	○
<p>Rope</p>  <p>NT-00024</p>	<ul style="list-style-type: none"> • Check if both front and rear wheels are rotated normally. • CVT model driving conditions: Driving speed of 30 km/h (19 MPH) or less Allow driving distance 50 km (31 miles) or less 	○	▲
<p>Raising the front wheels</p>  <p>NT-00025</p>	<p>Prohibited for full-time AWD model.</p>	×	×
<p>Lifting up the front wheels</p>  <p>NT-00026</p>	<ul style="list-style-type: none"> • Prohibited, due to damage on bumper, front grille, etc. • Do not raise the vehicle with bumper. 	×	×

Marked ○ : OK, Marked × : Prohibited, Marked ▲ : Conditionally OK

CAUTION:

- Place the shift lever in “N” position during towing.
- Do not lift up the rear wheels to avoid unsteady rotation.
- Turn the ignition key to “ACC”, then check the steering wheel moves freely. (Models without the keyless access with push button start system)
- Turn the ignition switch to “ACC” or “ON” position, and check that the steering wheel moves freely. (Models equipped with the keyless access with push button start system)
- Release the parking brake to avoid tire dragging.
- Since the power steering does not work, be careful for the heavy steering effort. (When engine is stopped)
- Since the servo brake does not work, be careful that the brake is not applied effectively. (When engine is stopped)
- In case of the malfunction of internal transmission or drive system, lift up four wheels (on a trailer) for towing.
- Do not use towing hook (eyebolt) except when towing.
- Make sure to detach the towing hook (eyebolt) after towing. If the hook remains attached, airbag may not operate properly when receiving a shock from front side. And it may also affect the crash performance of the vehicle.
- While being towed with all four wheels on the ground, turn the engine switch to ON but do not start the engine.
- If the ignition switch is ON while being towed with a rope, the pedestrian alert system may sound. (This is not a malfunction.)
- Do not activate the hybrid system.

14.CARRIER CAR

Before lowering the vehicle from the carrier car, perform the following operations.

CAUTION:

Always perform the following operations before lowering the vehicle from the carrier car. Otherwise, the power unit will rotate reversely, which may cause the damage to the engine, vacuum pump, and transmission.

- 1) Start the engine.
- 2) Set the transmission shift position into driving direction of the vehicle. (When the vehicle drives forward, do not set the transmission into R range. When the vehicle drives rearward, do not set the transmission into 1 — 5 speed, or D range.)

CAUTION:

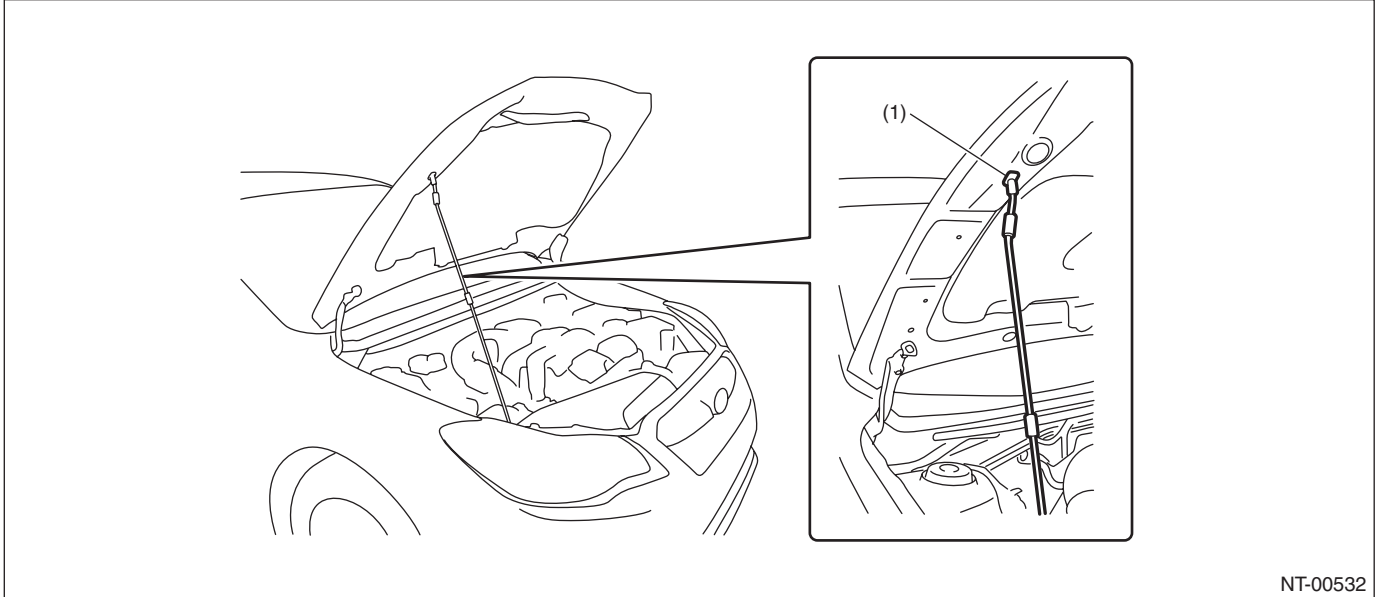
Be sure to perform 2) mentioned above even if the engine cannot be started in some reasons.

15.FRONT HOOD STAY

1) Always attach the stay to the normal position when performing works such as inspections and general maintenance.

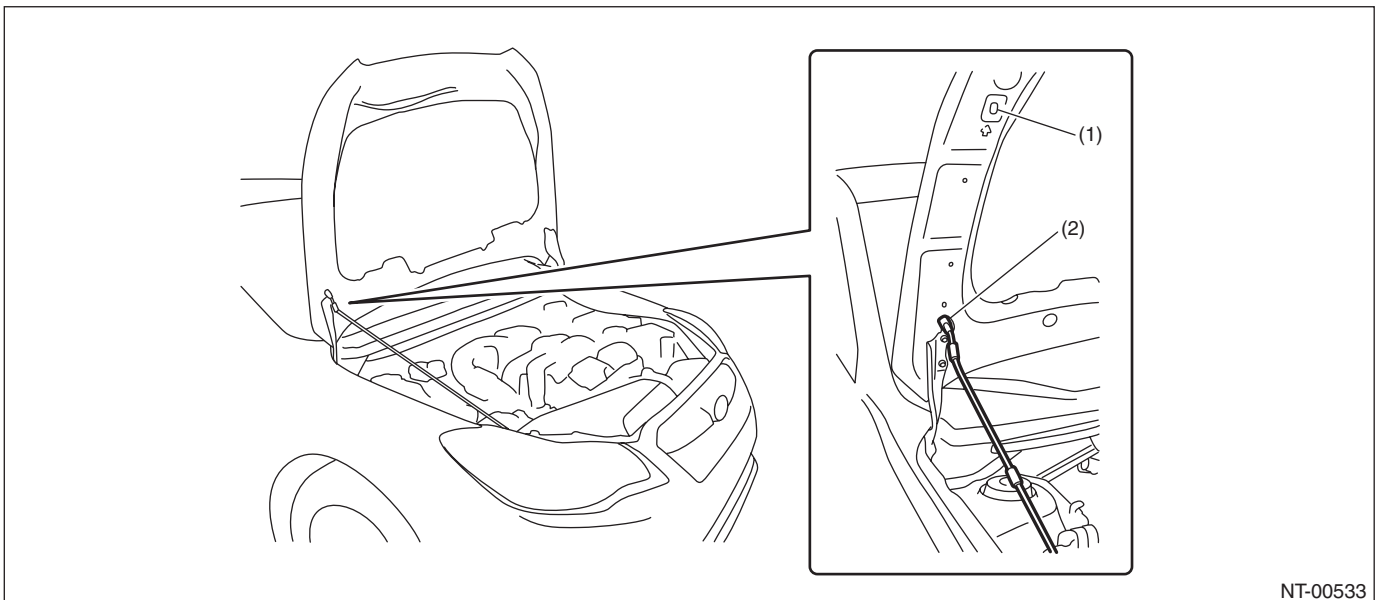
CAUTION:

- During the inspection and general maintenance, always be sure to turn the ignition switch to OFF.
- At the inspection and general maintenance, do not detach the stay.



(1) Normal attached position

2) When wider front hood opening is necessary, set the stay to the lower position (hood hinge) as shown in the figure.



(1) Normal attached position

(2) Installation position at full open

NOTE

16.GENERAL SCAN TOOL

Using general scan tools will greatly improve the efficiency of repairing engine electronic throttle controls. Subaru Select Monitor can be used to diagnose the engine, VDC, air conditioner and other parts.

17.AWD CIRCUIT MEASURES

1) Full-time AWD MT model

Since viscous coupling (limited slip differential) is used in the center differential, cut-off of AWD circuit cannot be carried out.

2) Full-time AWD CVT model

Since electronically controlled MP-T hydraulic multi-plate clutch is adapted for center differential, switch to FWD by using Subaru Select Monitor.

18.SPEEDOMETER TEST

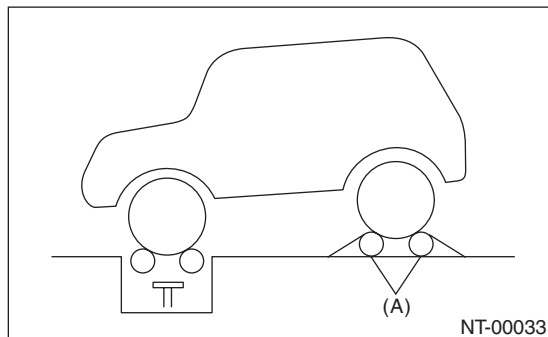
1) Rear wheel free roller system

(1) Set the free roller on the floor of rear wheel side securely according to the wheel base and rear tread of the vehicle.

(2) Let the vehicle ride on the tester and free roller gently.

CAUTION:

Fix the vehicle using a pulling metal (chain or wire) to the front and rear towing hooks or tie-down hook to prevent the lateral runout of front wheels and springing out of vehicle.



(A) Free roller

(3) Set the speedometer tester.

(4) Conduct the speedometer test work.

CAUTION:

Do not operate the clutch quickly and do not accelerate or decelerate suddenly during work.

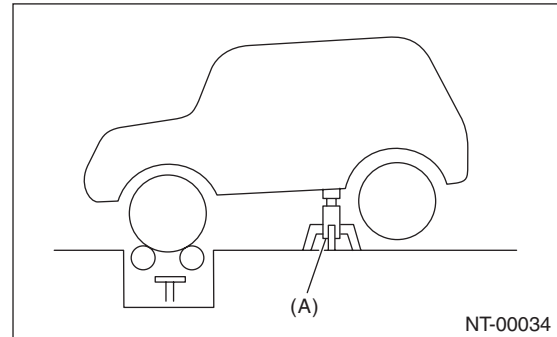
2) Rear wheel jack-up system

(1) Set the vehicle on speedometer tester.

CAUTION:

Fix the vehicle using a pulling metal (chain or wire) to the front and rear towing hooks or tie-down hook to prevent the lateral runout of front wheels and springing out of vehicle.

(2) Jack up the rear wheels and set the rigid racks to the specified locations of side sill.



(A) Rigid rack

(3) Conduct the speedometer test work.

CAUTION:

Do not operate the clutch quickly and do not accelerate or decelerate suddenly during work.

19.BRAKE TEST

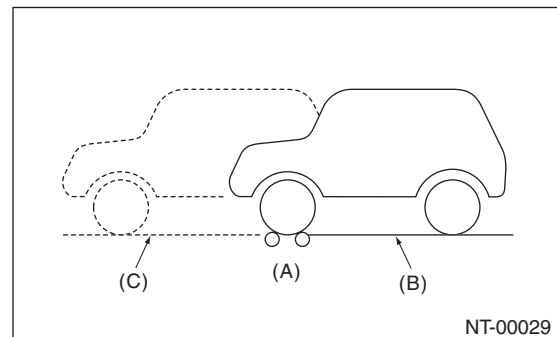
1) Full-time AWD MT model

(1) Perform this test after driving the vehicle 2 to 3 km (1.24 to 1.86 miles) on road in order to stabilize the viscous torque of viscous coupling.

(2) Keep the front or rear wheels on the ground for this test.

NOTE:

Effect of the viscous torque on braking force will be added approx. 25 kg compared with FWD model.



(A) Brake tester

(B) Position for measuring front wheel

(C) Position for measuring rear wheel

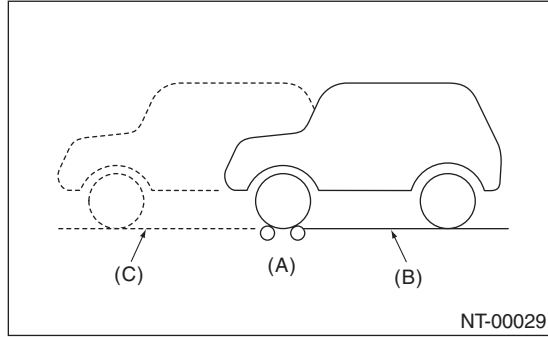
(3) When the brake dragging force is large.

- Check the dragging of brake pad or brake shoe.

- Since it may be affected by the viscosity of viscous coupling, jack up either of the front or rear two wheels to check the each wheel rotation condition with the viscous coupling affection removed.

2) Full-time AWD CVT model

- (1) Keep the front or rear wheels on the ground during measurement.



- (A) Brake tester
(B) Position for measuring front wheel
(C) Position for measuring rear wheel

- (2) When the brake dragging force is large.

- Check the dragging of brake pad or brake shoe.

Specifications:

	Braking force
Rear wheel total	10% or more of load on front or rear wheels
Difference between right and left wheels	8% or less of load on front or rear wheels
Grand total	50% or more of vehicle weight at the time of test

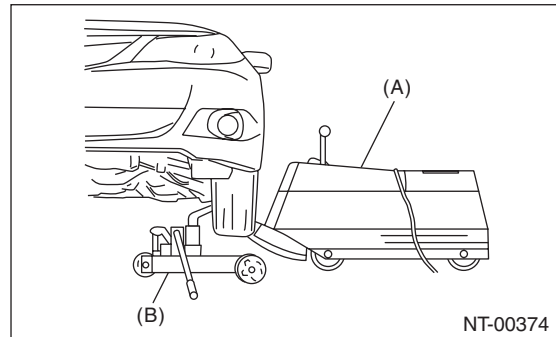
- When measurement is difficult to carry out because both of front wheels are locked, break force measurement in this condition conforms to standard grand total.

20.ON THE CAR WHEEL BALANCING

CAUTION:

- Carry out the procedures after measuring the balance of each single tire.
- Set the vehicle so that the front and rear wheels are the same height.
- Make sure that the VDC is deactivated.
- Release the parking brake during measurement.
- Rotate each wheel by hands, and make sure it rotates without dragging.
- Do not operate the clutch quickly and do not accelerate or decelerate suddenly during work.
- When an error is indicated during engine drive, do not use the motor drive together.

- 1) Set the rigid rack to the specified locations of side sill, jack up the front or rear two wheels of non-measuring side and set the pickup stands to two wheels of measuring side.



- (A) Balancer body
(B) Pickup stand (left and right)

- 2) For drive wheel, drive the tires with engine for measurement.

- 3) For non-drive wheel, drive the tires from the on the car wheel balancer for measurement.

NOTE

IDENTIFICATION

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