

FOREWORD

This repair manual has been prepared to provide essential information on body panel repair methods (including cutting and welding operations, but excluding painting) for the TOYOTA CAMRY Hybrid Vehicle.

Applicable models: AHV 40 series

This manual consists of body repair methods, exploded diagrams and illustrations of the body components and other information relating to body panel replacement such as handling precautions, etc. However, it should be noted that the front fenders of this TOYOTA model are bolted on and require no welding.

When repairing, don't cut and join areas that are not shown in this manual. Only work on the specified contents to maintain body strength.

Body construction will sometimes differ depending on specifications and country of destination. Therefore, please keep in mind that the information contained herein is based on vehicles for general destinations.

For the repair procedures and specifications other than collision-damaged body components of the TOYOTA CAMRY Hybrid Vehicle refer to the repair manuals.

If you require the above manuals, please contact your TOYOTA dealer.

All information contained in this manual is the most up-to-date at the time of publication. However, specifications and procedures are subject to change without prior notice.

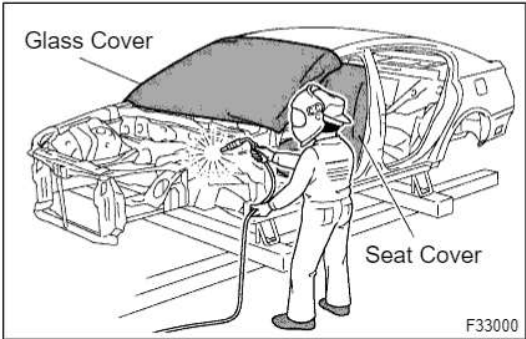
TOYOTA MOTOR CORPORATION

PRECAUTION
GENERAL REPAIR INSTRUCTIONS

1. WORK PRECAUTIONS

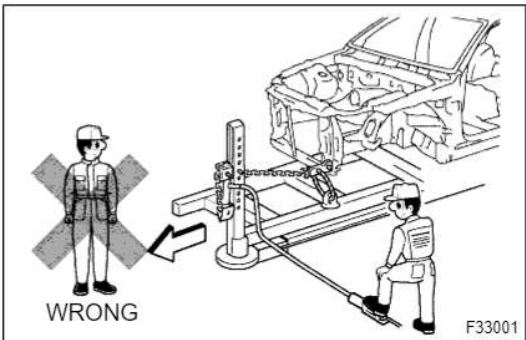
(a) VEHICLE PROTECTION

- (1) When welding, protect the painted surfaces, windows, seats and carpet with heat resistant, fireproof covers.

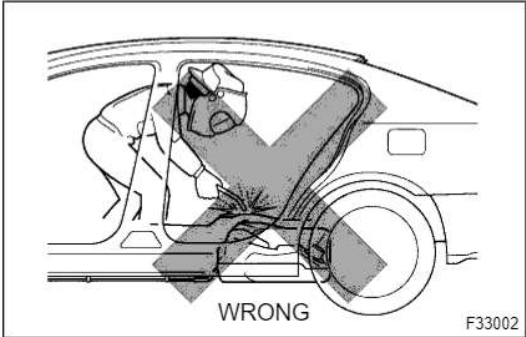


(b) SAFETY

- (1) Never stand in a direct line with the chain when using a puller on the body or frame, and be sure to attach a safety cable.

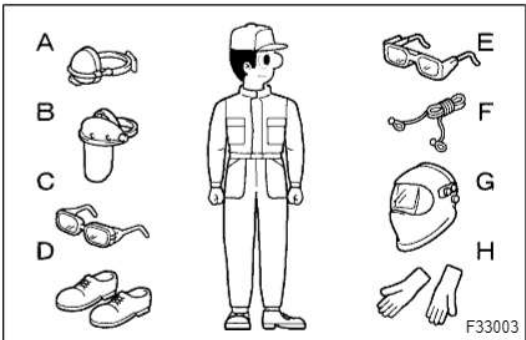


- (2) Before performing repair work, check for fuel leaks. If a leak is found, be sure to close the opening completely.
- (3) If it is necessary to use a flame in the area of the fuel tank, first remove the tank and plug the fuel line.



(c) SAFETY WORK CLOTHES

- (1) In addition to the usual mechanic's wear, cap and safety shoes, the appropriate gloves, head protector, glasses, ear plugs, face protector, dust-prevention mask, etc. should be worn as the situation demands.



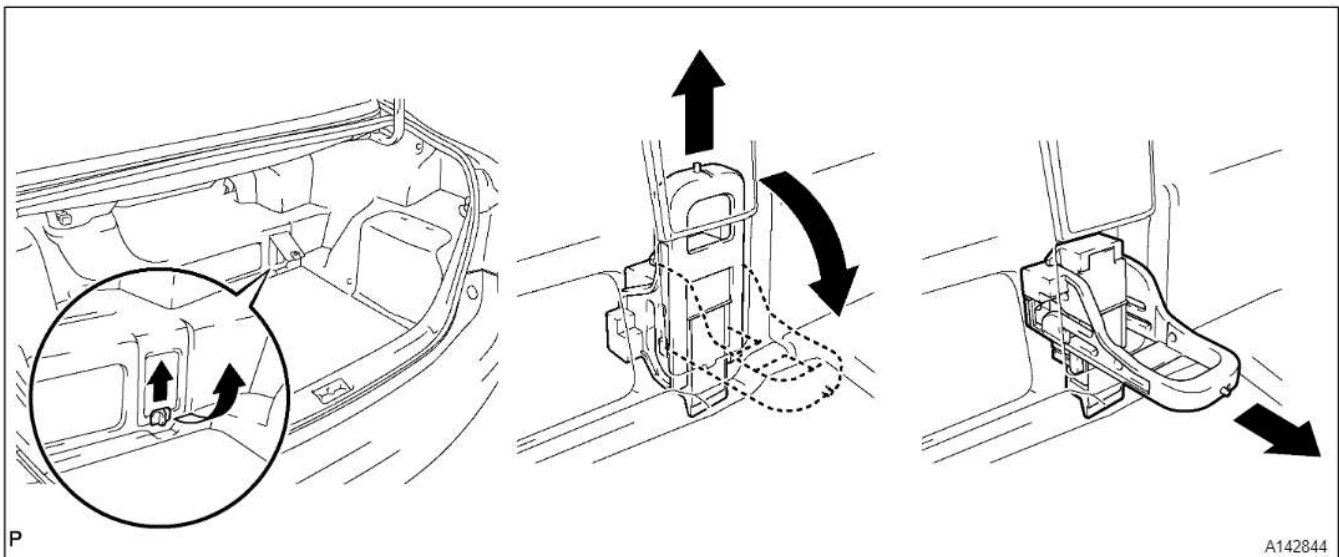
Code	Name
A	Dust-Prevention Mask
B	Face Protector
C	Eye Protector
D	Safety Shoes
E	Welder's Glasses
F	Ear Plugs
G	Head Protector
H	Welder's Gloves

2. PRECAUTIONS FOR HIGH-VOLTAGE CIRCUIT INSPECTION AND SERVICE

NOTICE:

The CAMRY HV hybrid system contains a 288V high-voltage system with a strong alkali solution of potassium hydroxide. Be sure to follow the instructions in this manual to handle the system correctly. Failure to do so may result in serious injury or electrocution.

- (a) Engineer must undergo special training to be able to perform high-voltage system inspection and servicing.
- (b) All high-voltage wire harness connectors are colored orange. The HV battery and other high-voltage components have "High Voltage" caution labels. Do not carelessly touch these wires and components.
- (c) Before inspecting or servicing the high-voltage system, be sure to follow safety measures, such as wearing insulated gloves and removing the service plug to prevent electrocution. Carry the removed service plug in your pocket to prevent other technicians from reinstalling it while you are servicing the vehicle.



NOTICE:

Do not put the vehicle into the READY-on state after removing the service plug grip as the ECU may be damaged.

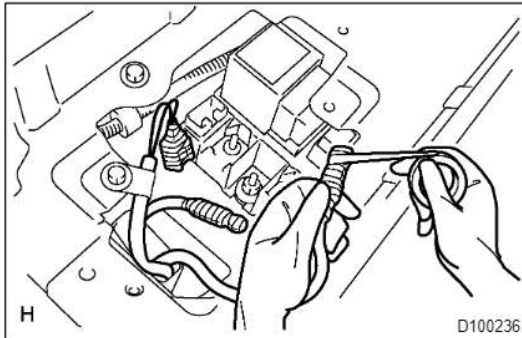
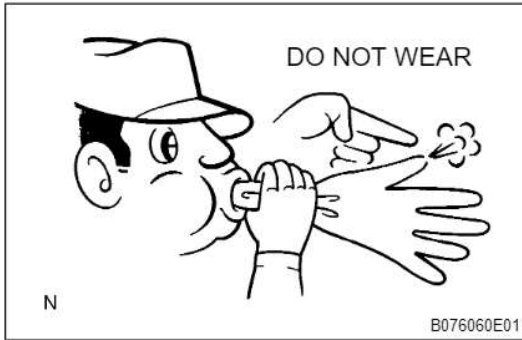
- (d) After removing the service plug, wait 5 minutes before touching any of the high-voltage connectors and terminals.

HINT:

5 minutes are required to discharge the high-voltage condenser inside the inverter.

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- (e) Before wearing insulated gloves, make sure that they are not cracked, ruptured, torn, or damaged in any way. Do not wear wet insulated gloves.
- (f) When servicing the vehicle, do not carry metal objects like mechanical pencils or scales that can be dropped accidentally and cause a short circuit.
- (g) Before touching a bare high-voltage terminal, wear insulated gloves and use a tester to make sure that the terminal voltage 0 V.
- (h) After disconnecting or exposing a high-voltage connector or terminal, insulate it immediately using insulation tape.
- (i) The screw of a high-voltage terminal should be tightened firmly to the specified torque. Both insufficient and excessive torque can cause failure.
- (j) Use the "CAUTION: HIGH VOLTAGE. DO NOT TOUCH DURING OPERATION" sign to notify other engineers that a high-voltage system is being inspected and/or repaired.
- (k) After servicing the high-voltage system and before reinstalling the service plug, check again that you have not left a part or tool inside, that the high-voltage terminal screws are firmly tightened, and that the connectors are correctly connected.
- (l) Do not place the battery upside down while removing and installing it.

**CAUTION:
HIGH VOLTAGE. DO
NOT TOUCH DURING
OPERATION.**

Person in charge: _____

**CAUTION:
HIGH VOLTAGE. DO
NOT TOUCH DURING
OPERATION.**

Person in charge: _____

Copy this page and put it after folding on the roof of the vehicle in service.

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3. ACTIONS TO BE TAKEN FOR VEHICLE DAMAGED BY IMPACT

NOTICE:

The CAMRY HV hybrid system contains a 288 V high-voltage system with a strong alkali solution of potassium hydroxide. Be sure to follow the instructions in this manual to handle the system correctly. Failure to do so may result in serious injury or electrocution.

(a) Items to be prepared or operation at the accident site

- Protective clothing (insulated gloves, rubber gloves, goggles, and safety shoes)
- Saturated boric acid solution 20 L (obtain 800 g of boric acid powder, put it into a container, and dissolve it in water)
- Red litmus paper
- ABC fire extinguisher (effective against both oil flames and electrical flames)
- A shop rag or piece of cloth (for wiping off the electrolyte)
- Insulation tape (for insulating cable)
- Electrical tester

(b) Actions to be taken at the accident site

NOTICE:

Do not touch a bare cable that may have high-voltage. If the cable must be touched or if accidental contact is unavoidable, wear insulated gloves and insulate the cable using insulation tape.

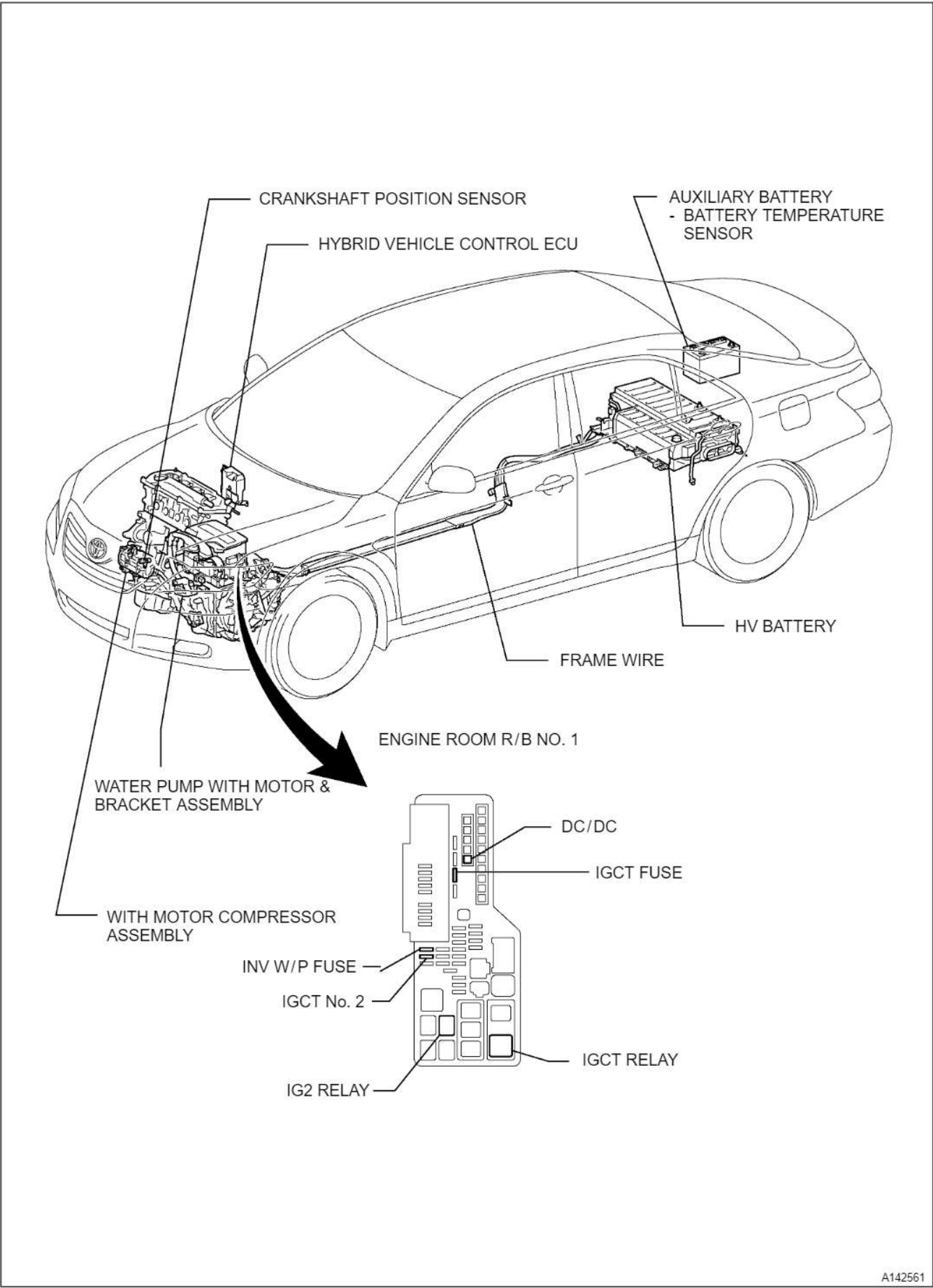
- If the vehicle catches on fire, use an ABC fire extinguisher to extinguish the fire. Trying to extinguish a fire using only a small amount of water can be more dangerous than effective. Use a substantial amount of water or wait for firefighters.
- Visually check the HV battery and the immediate area for any electrolyte leakage. Do not touch any leaked liquid because it could be highly alkaline electrolyte.
- Work on the vehicle only after the vehicle has been pulled out of the water.

- (1) Check the vicinity of the hybrid vehicle battery for any leakage of the electrolyte.

NOTICE:

Do not touch any leaked liquid because it could be highly alkaline electrolyte. Wear rubber gloves and goggles, neutralize the liquid with saturated boric acid solution, and then apply red litmus paper to the leak. Check that the paper does not turn blue. Wipe the neutralized liquid with a shop rag or piece of cloth.

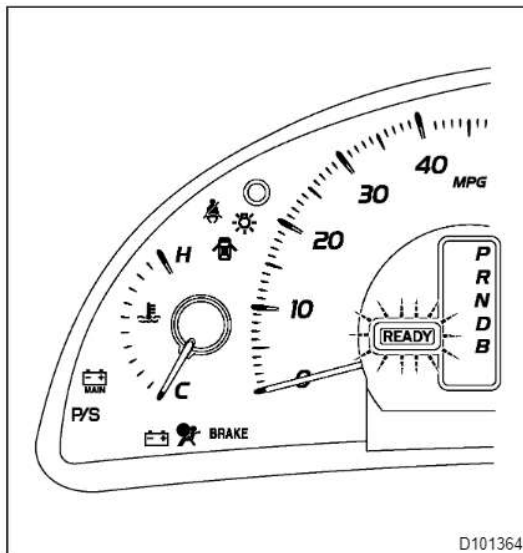
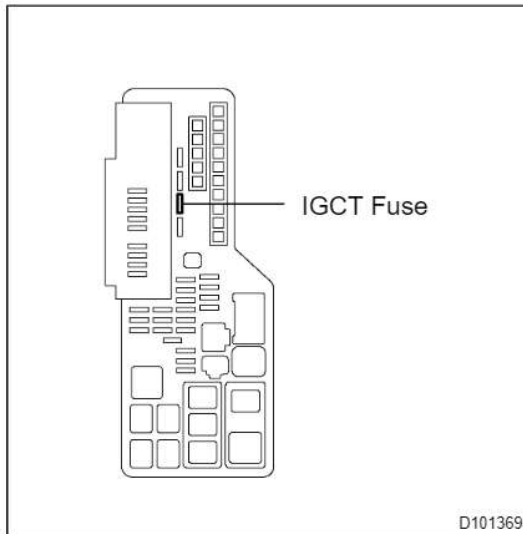
- (2) If damage to any of the high-voltage components and cable is suspected, cut the high-voltage circuit using the procedure on the following pages.



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- (3) Turn the power switch off.

HINT:

If the power switch cannot be turned off, remove the IGCT fuse from the engine room R/B No. 1 or disconnect the cable from the negative terminal of the auxiliary battery.

- (4) Wear insulated gloves, and then remove the service plug.

NOTICE:

Be sure to install the service plug before turning on (IG) the power switch. Starting the hybrid system with the service plug removed may damage the ECU.

- (c) Moving the damaged vehicle
If any of the following conditions are met, tow the vehicle away using a tow truck.

- One or more of the high-voltage components and cables are damaged.
- The driving, traction, or fuel system is damaged.
- The master warning light is on.
- The READY light does not come on when the vehicle is in the READY-on state.

CAUTION:

- **Before towing the vehicle away using a tow truck, disconnect the cable from the negative (-) terminal of the auxiliary battery and remove the service plug.**

NOTICE:

Perform the procedure below if the READY light turns off, or there are abnormal noises, unusual smells, or strong vibrations while driving:

- (1) Park the vehicle in a safe place.
 - (2) Shift the shift lever to the "P" position, and apply the parking brake.
 - (3) Turn the power switch off, and disconnect the power cable from the negative (-) terminal of the auxiliary battery.
 - (4) Remove the service plug while wearing insulated gloves.
- (d) Actions required after moving the damaged vehicle
- (1) Procedure
If you see any liquid on the road surface, it could be highly alkaline electrolyte leakage. Wear rubber gloves and goggles, neutralize the liquid with saturated boric acid solution, and then apply red litmus paper to the leak. Check that the paper does not turn blue. Wipe the neutralized liquid with a shop rag or piece of cloth.
- (e) Items to be prepared (when repairing damaged vehicles)
- Protective clothing (Insulated gloves, rubber gloves, goggles, and safety shoes)

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- Saturated boric acid solution 20 L (obtain 800 g of boric acid powder, put it into a container, and dissolve it in water)
 - Red litmus paper
 - Shop rags (for wiping off the electrolyte)
 - Vinyl tape (for insulating cable)
 - Electrical tester
- (f) Precautions to be observed when servicing the damaged vehicle

NOTICE:

Always follow instructions to ensure safety.

- (1) Wear insulated or rubber gloves, goggles, and safety shoes.
- (2) Check the HV battery and immediate area for any electrolyte leakage.
Do not touch any leaked liquid because it could be highly alkaline electrolyte. Wear rubber gloves and goggles, neutralize the liquid with saturated boric acid solution, and then apply red litmus paper to the leak. Check that the paper does not turn blue. Wipe the neutralized liquid with a shop rag or piece of cloth.

NOTICE:

- **If the electrolyte comes in contact with your skin, use a saturated boric acid solution or a large amount of water to wash it off. If the electrolyte comes in contact with an article of clothing, take it off immediately.**
 - **If the electrolyte comes in contact with your eyes, call out loudly for help. Do not rub your eyes. Wash them immediately with a large amount of water and seek medical care.**
- (3) Do not touch a bare cable that could be a high voltage cable. If the cable must be touched or if accidental contact is unavoidable, follow the following instructions: 1) wear insulated or rubber gloves and goggles, 2) measure the voltage between the cable and the body ground using an electrical tester, and 3) insulate the cable using insulation tape.
 - (4) If damage to any of the high-voltage components and cables is suspected, cut the high-voltage circuit using the procedure below.

NOTICE:

Do not touch a bare cable that may have high-voltage. If the cable must be touched or if accidental contact is unavoidable, wear insulated gloves and insulate the cable using insulation tape.

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- (5) Turn the power switch off.

HINT:

If the power switch cannot be turned off, remove the IGCT fuse from the HV relay block or disconnect the cable from the negative terminal of the auxiliary battery.

- (6) Wear insulated gloves, and then remove the service plug.

- (g) Precautions to be taken when disposing of the vehicle

- (1) Disposing of HV battery

When scrapping the vehicle, remove the HV battery from the vehicle and return it to the location specified by the manufacturer. Any damaged HV battery should also be returned to the specified location.

CAUTION:

- After removing the battery, keep it away from water. Water may heat the battery, which results in fire.
- Accidents such as electric shocks could result if the vehicle and its hybrid vehicle battery are disposed of improperly or abandoned. Therefore, make sure to return any hybrid battery to the prescribed recovery route through a TOYOTA dealer.

- (h) Precautions to be observed when towing

- (1) Tow the damaged vehicle with its front and rear wheels lifted off the ground.

CAUTION:

Towing the damaged vehicle with its front wheels on the ground may cause the motor to generate electricity. This electricity could, depending on the nature of the damage, leak and cause a fire.

- (i) Towing with the 4 wheels on the ground

CAUTION:

- If the damaged vehicle needs to be towed using a rope, do not exceed 30 km/h (19 mph) and tow a limit distance and then have the vehicle towed by a truck.
- Turn the power switch to the on (IG) and shift the selector lever to the N position.
- If any abnormality is present in the damaged vehicle during towing, stop towing immediately.

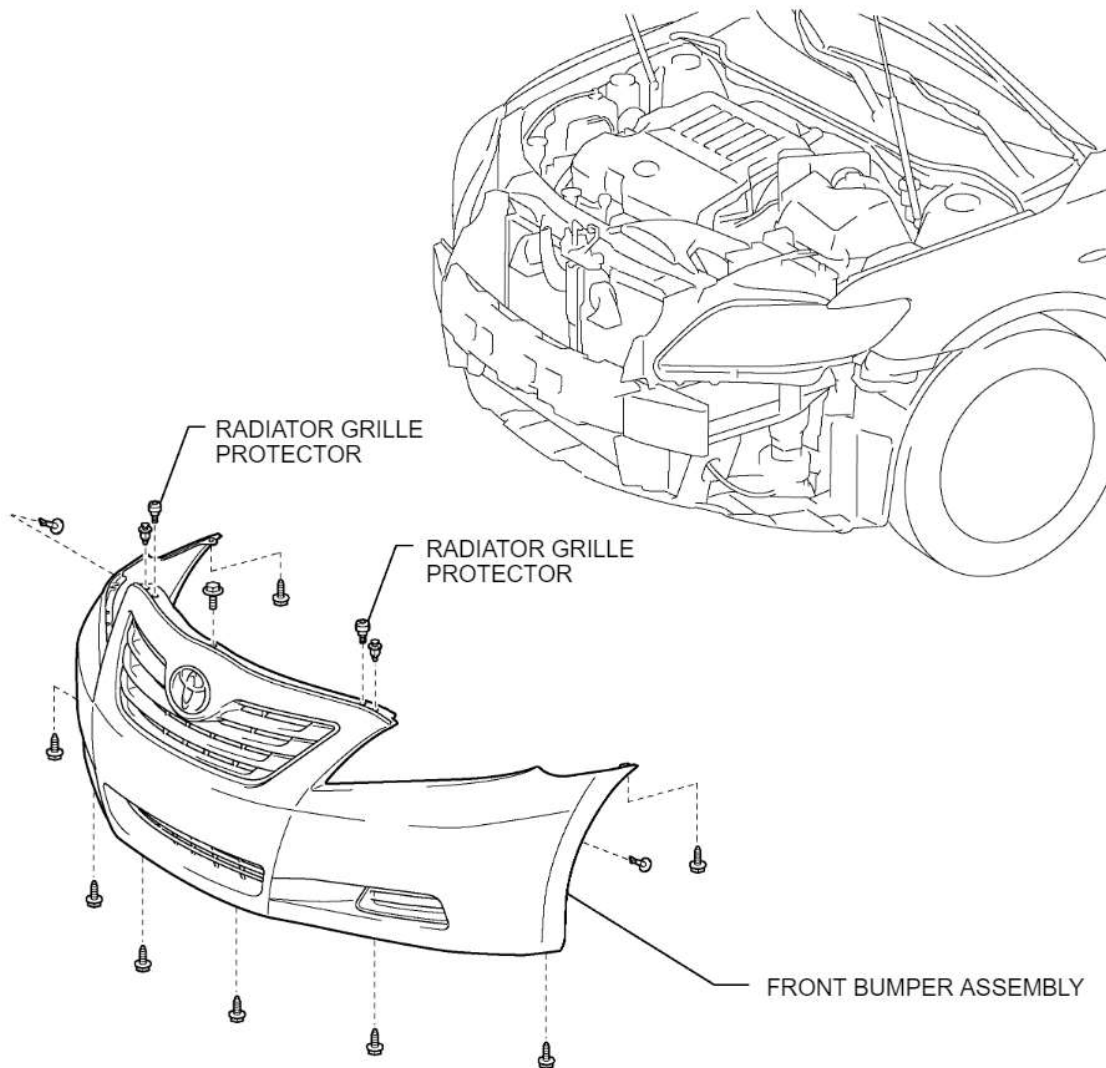
ABBREVIATIONS USED IN THIS MANUAL

For convenience, the following abbreviations are used in this manual.

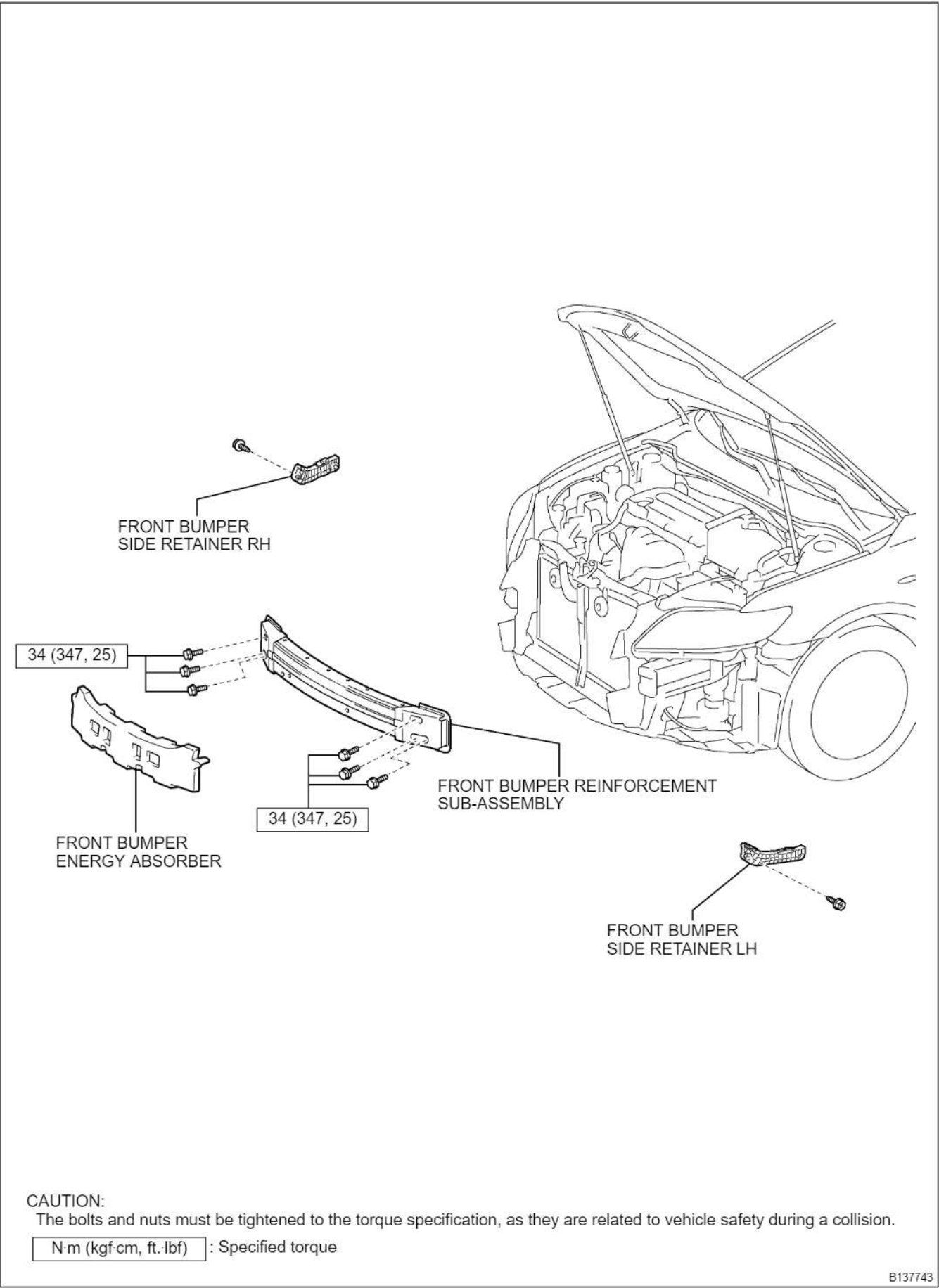
ABS	Antilock Brake System
A/C	Air Conditioner
assy	assembly
ECT	Electronic Controlled Transmission
ECU	Electronic Control Unit
e.g.	Exempli Gratia (for Example)
Ex.	Except
FWD	Front Wheel Drive Vehicles
2WD	Two Wheel Drive Vehicles
4WD	Four Wheel Drive Vehicles
in.	inch
LH	Left-hand
LHD	Left-hand Drive
MIG	Metal Inert Gas
M/Y	Model Year
PPS	Progressive Power Steering
RH	Right-hand
RHD	Right-hand Drive
SRS	Supplemental Restraint System
SSM	Special Service Materials
w/	with
w/o	without

COMPONENTS

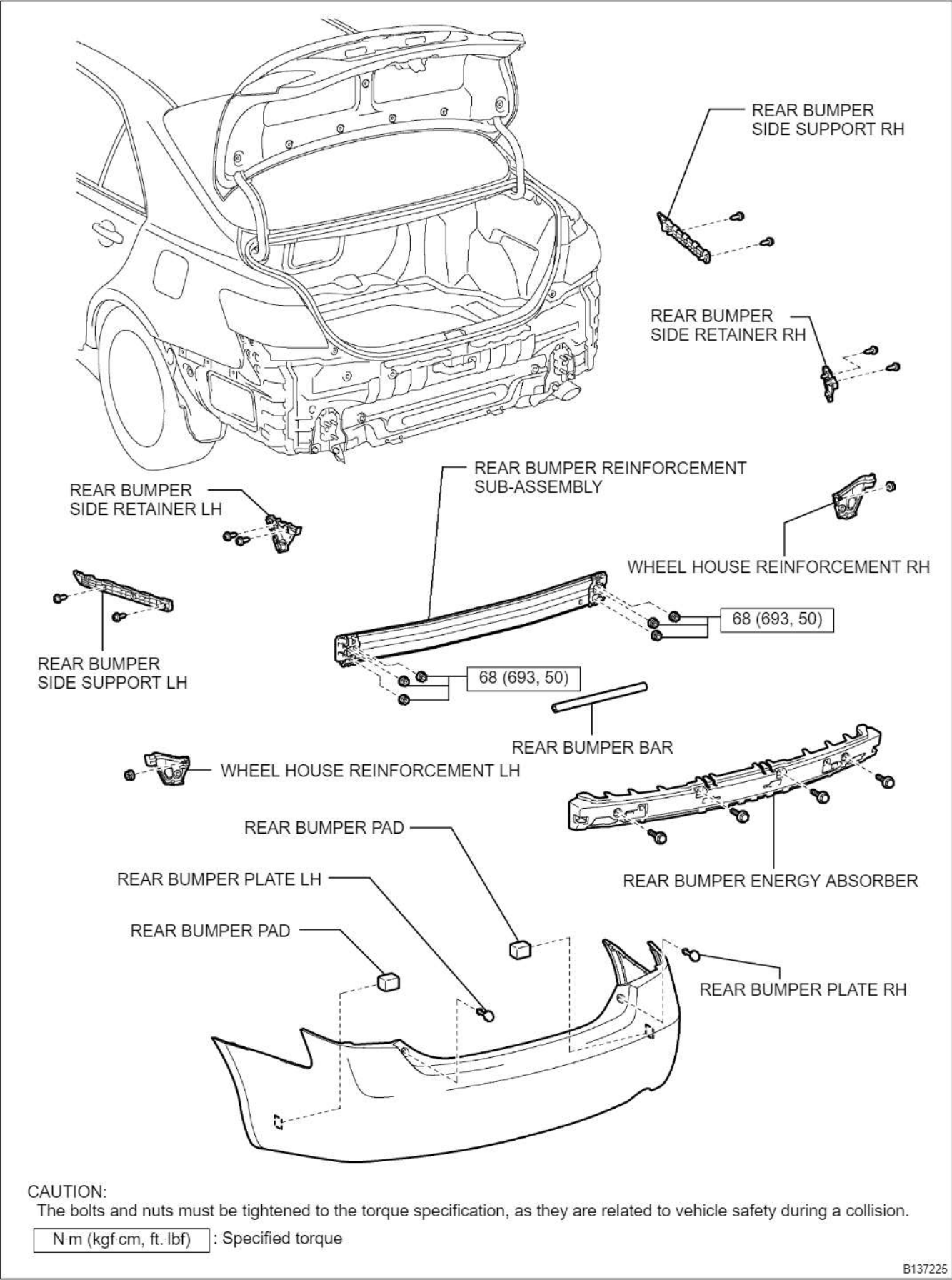
1. Front bumper



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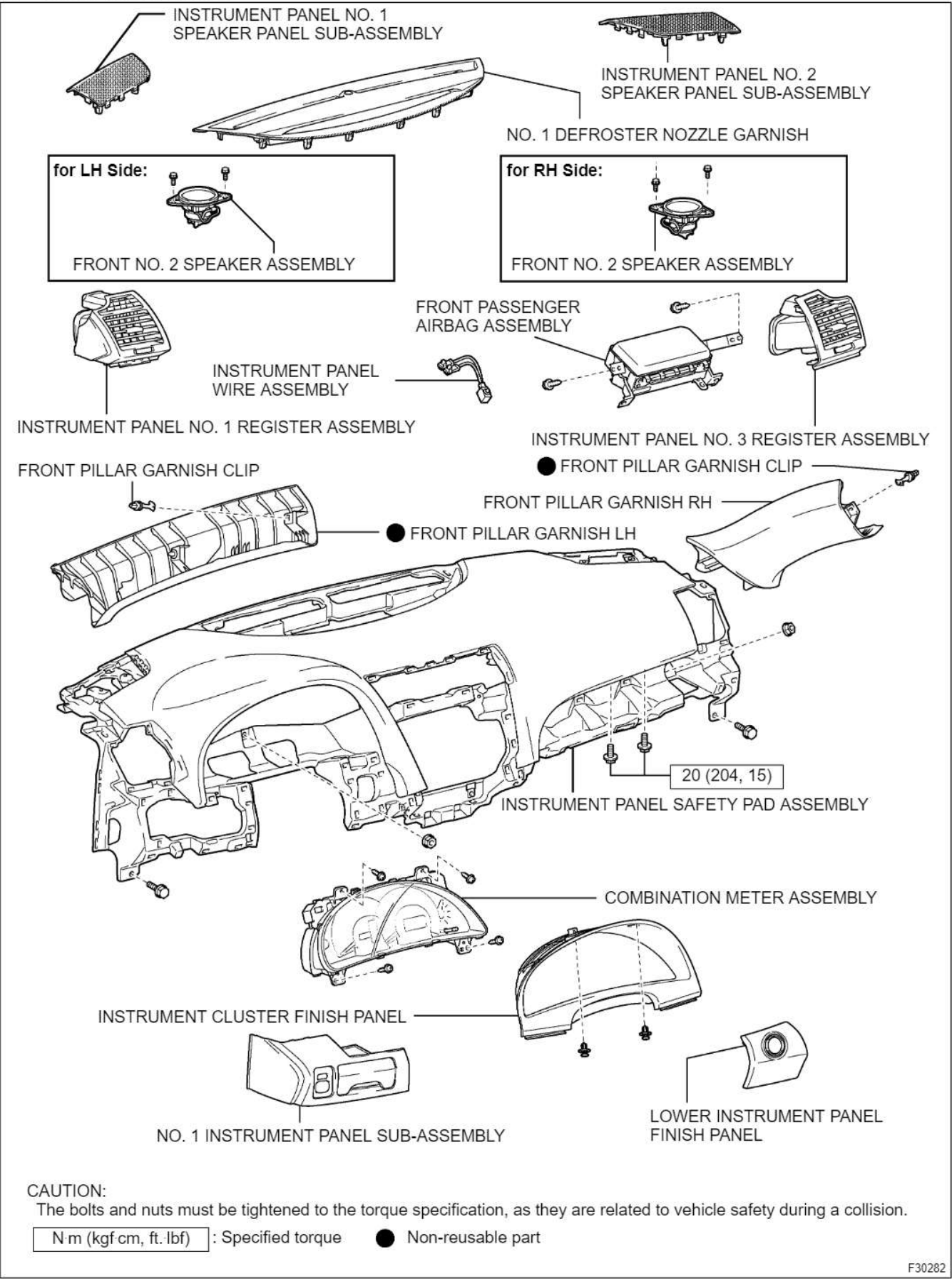
2. Rear bumper



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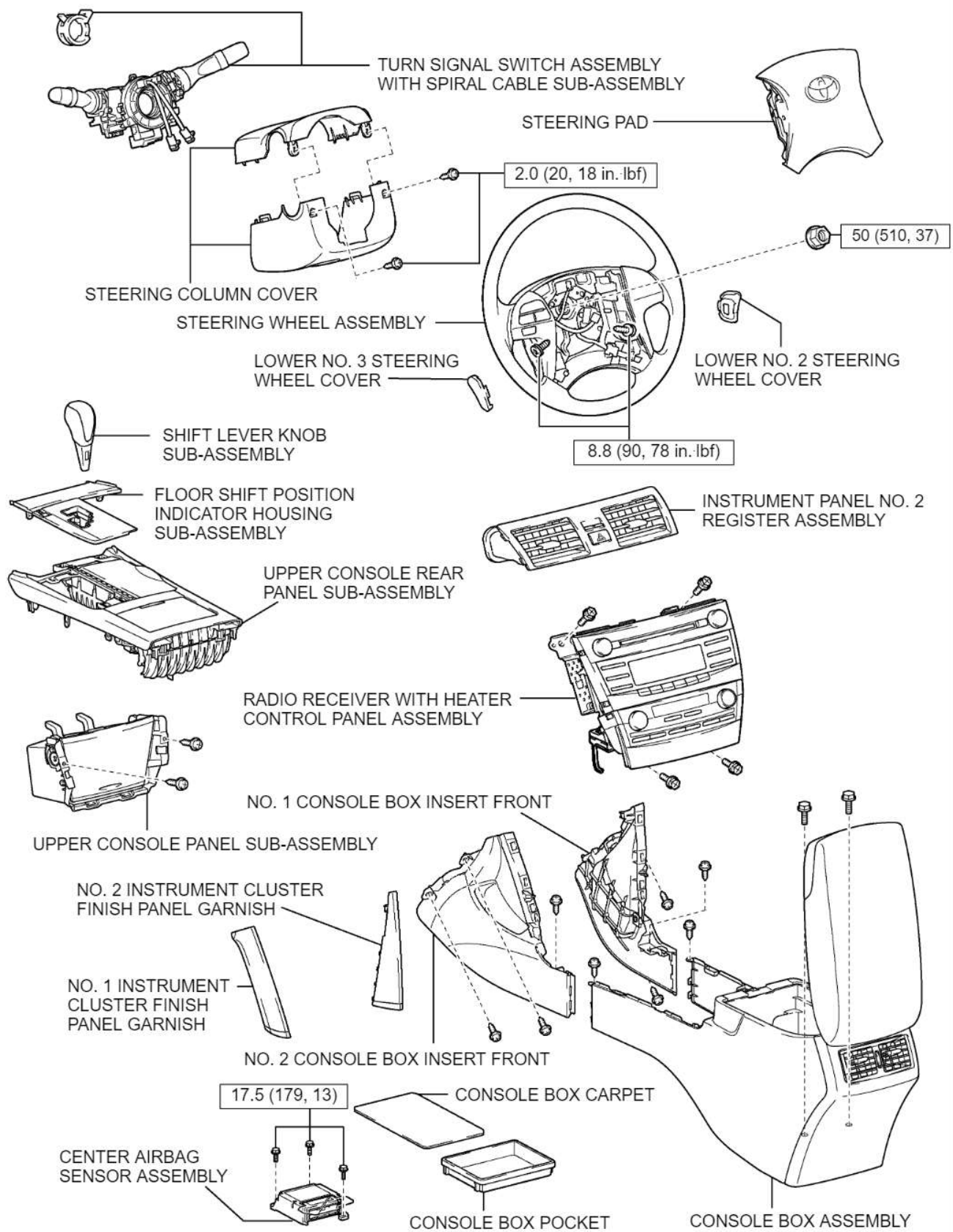
INTRODUCTION

3. Instrument panel



INTRODUCTION

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**CAUTION:**

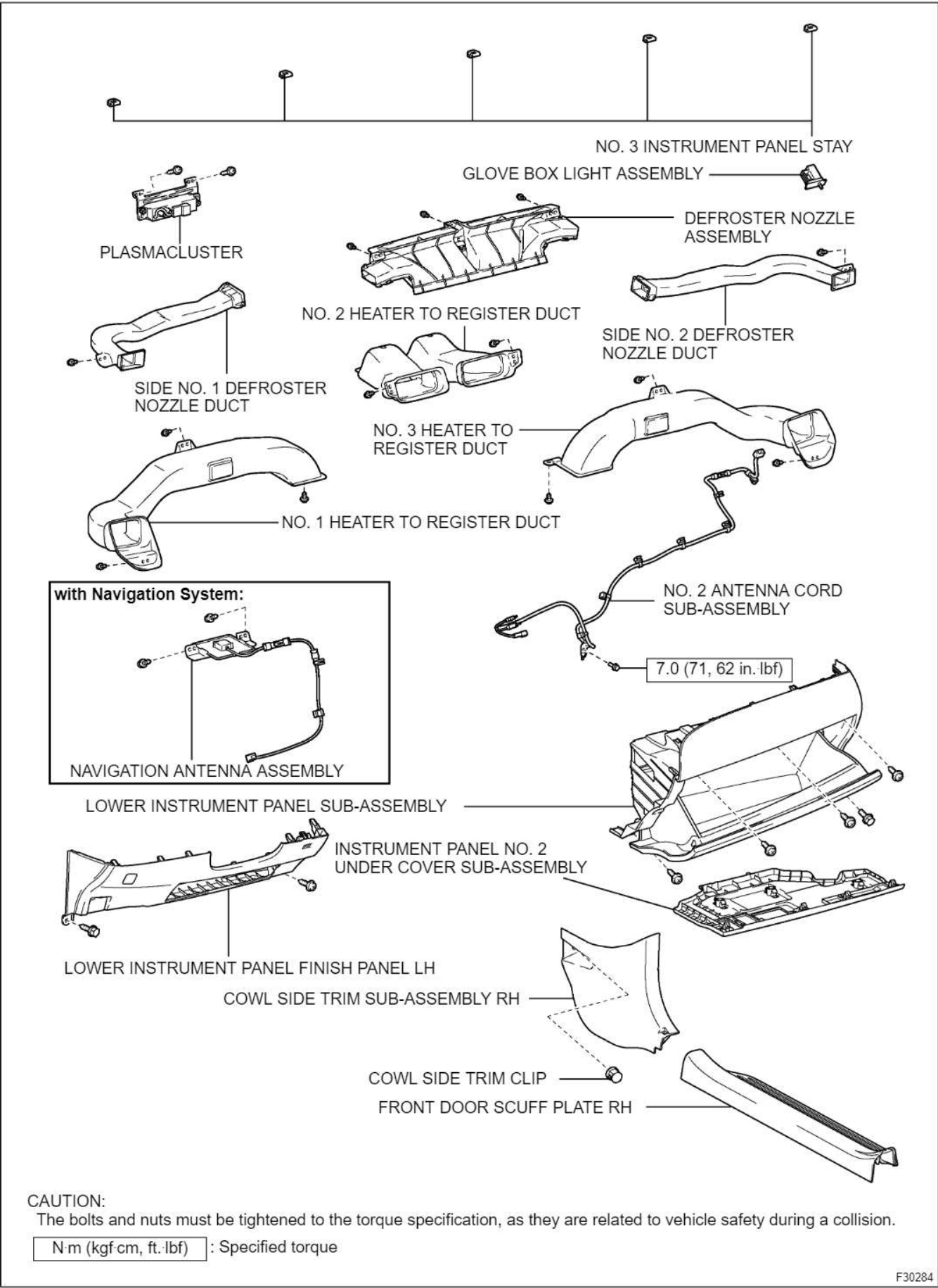
The bolts and nuts must be tightened to the torque specification, as they are related to vehicle safety during a collision.

N·m (kgf·cm, ft. lbf) : Specified torque

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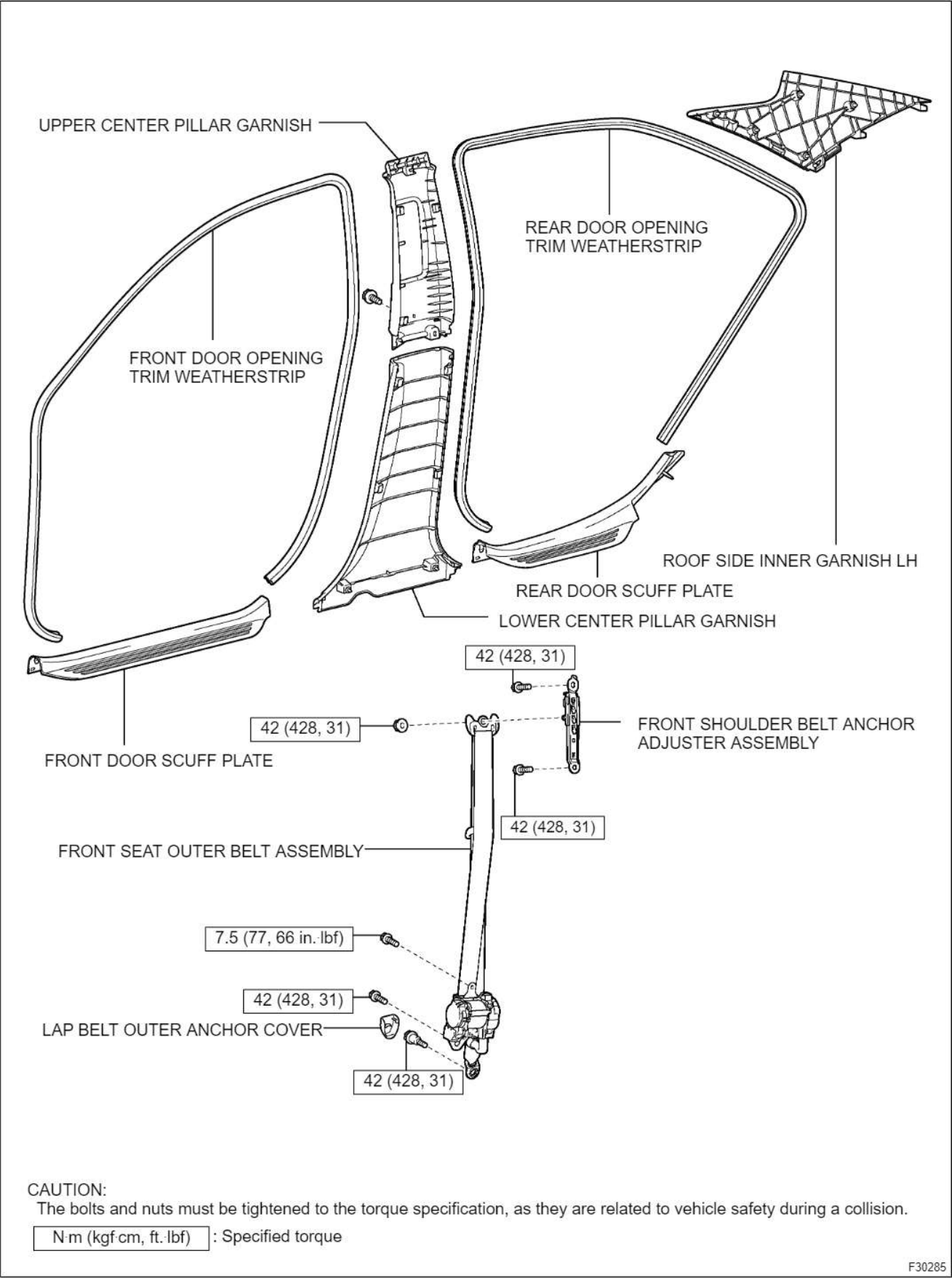
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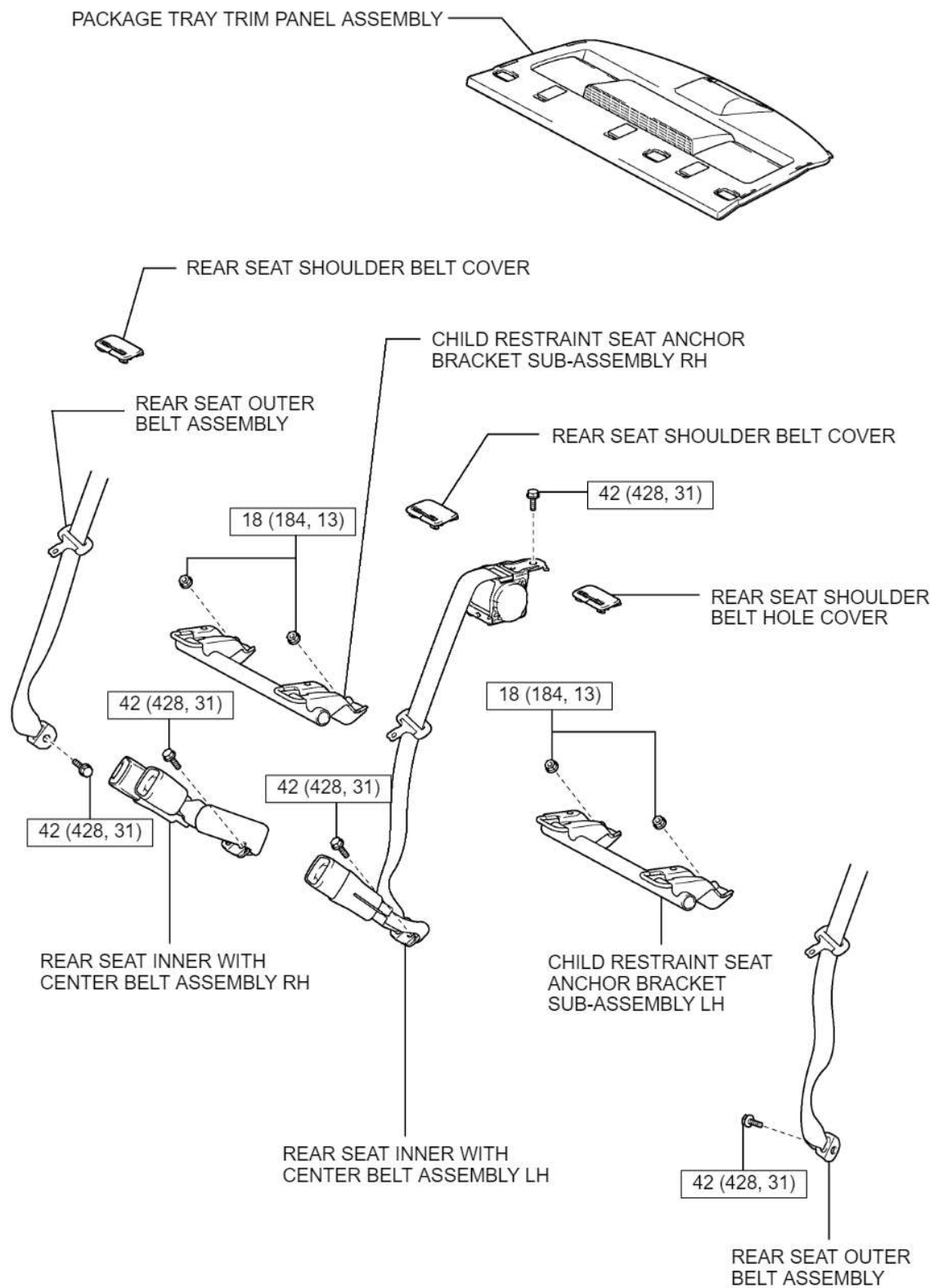
INTRODUCTION



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4. Interior trim





CAUTION:
The bolts and nuts must be tightened to the torque specification, as they are related to vehicle safety during a collision.

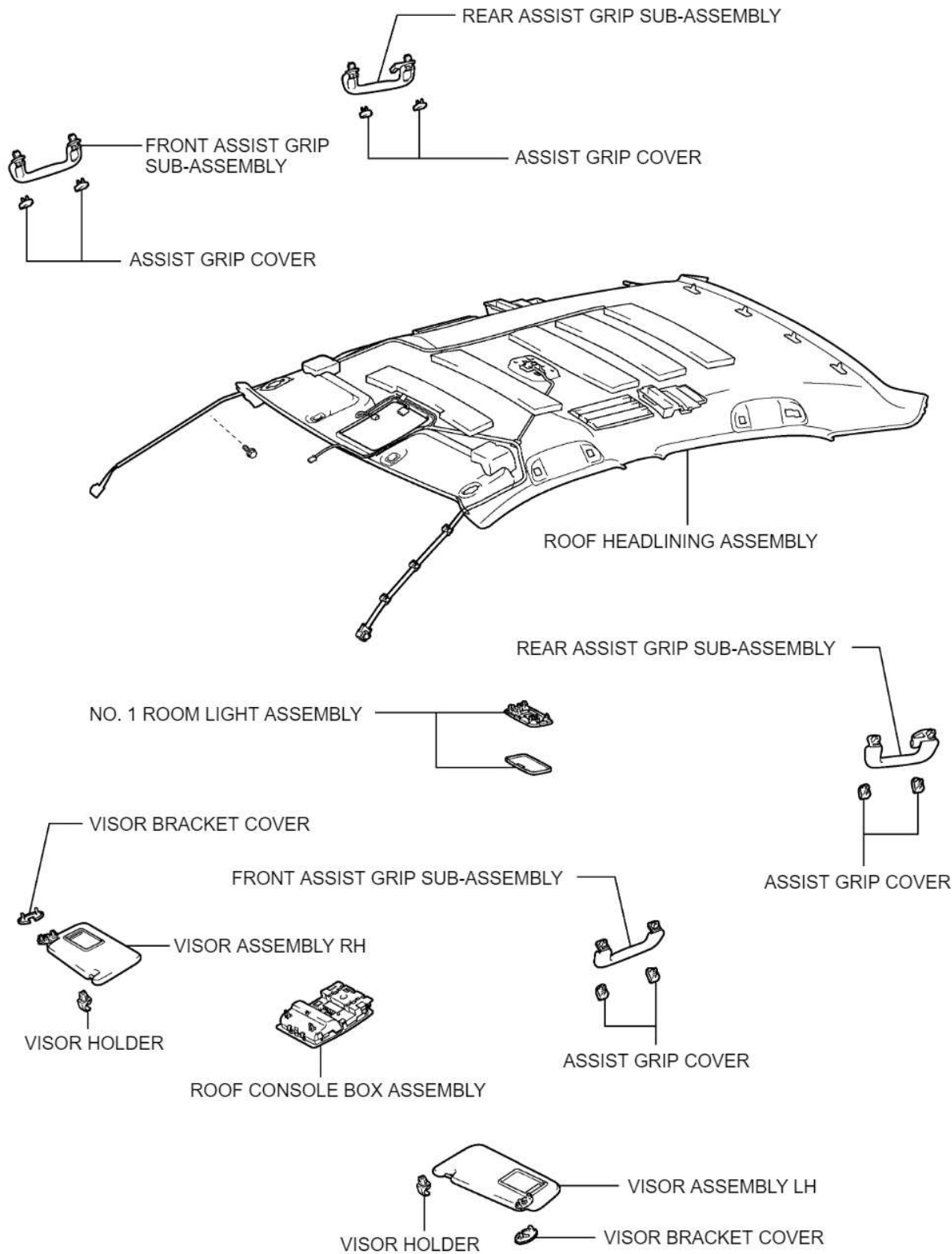
N·m (kgf·cm, ft. lbf)	: Specified torque
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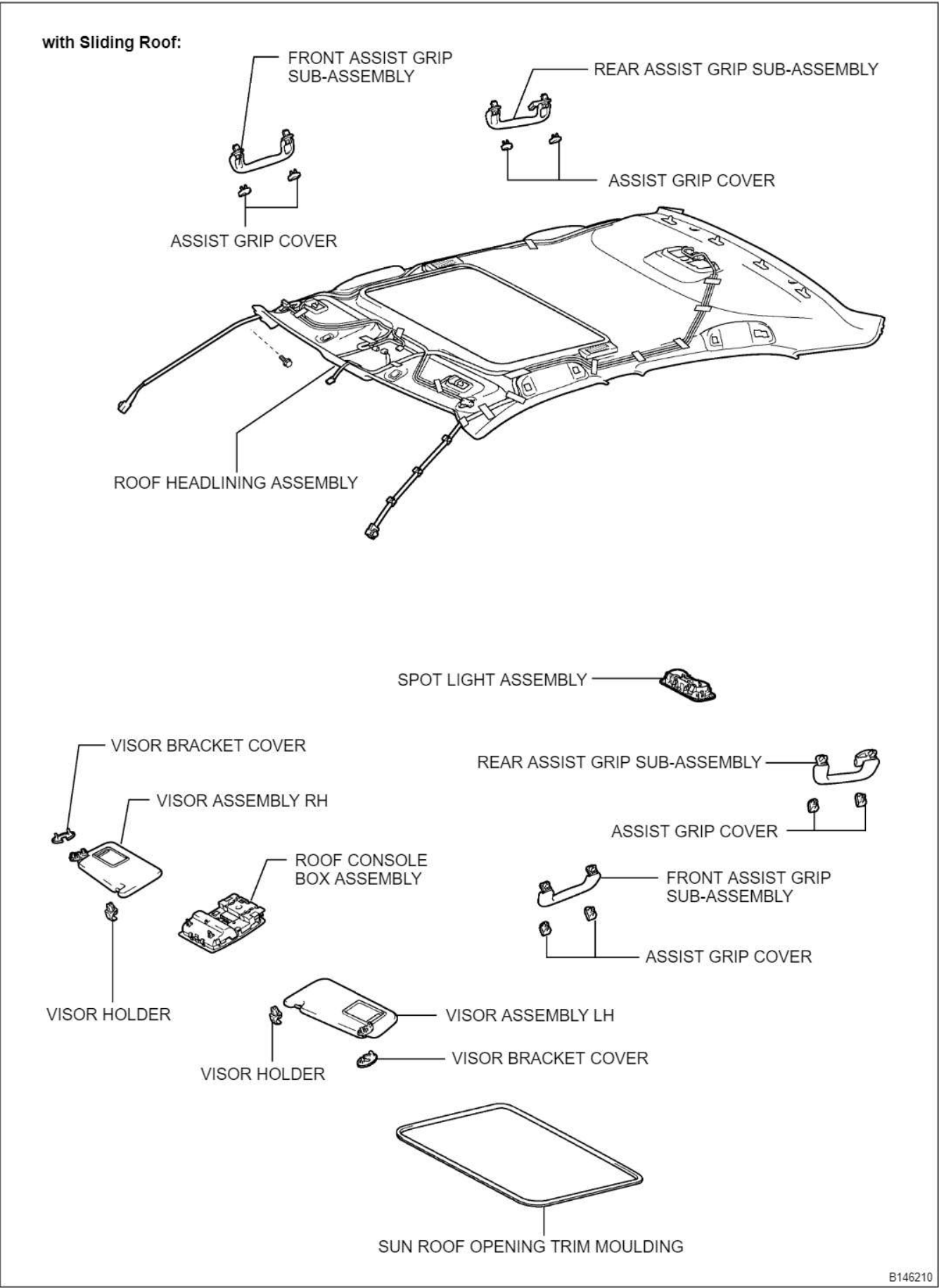
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without Sliding Roof:

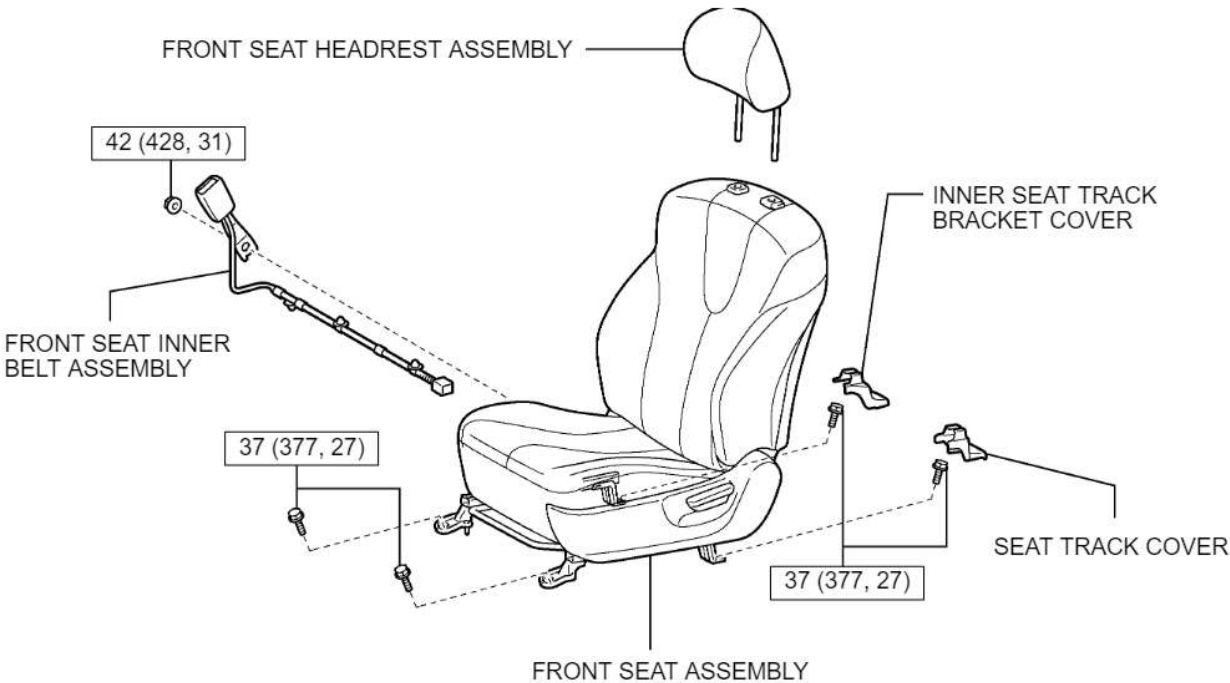


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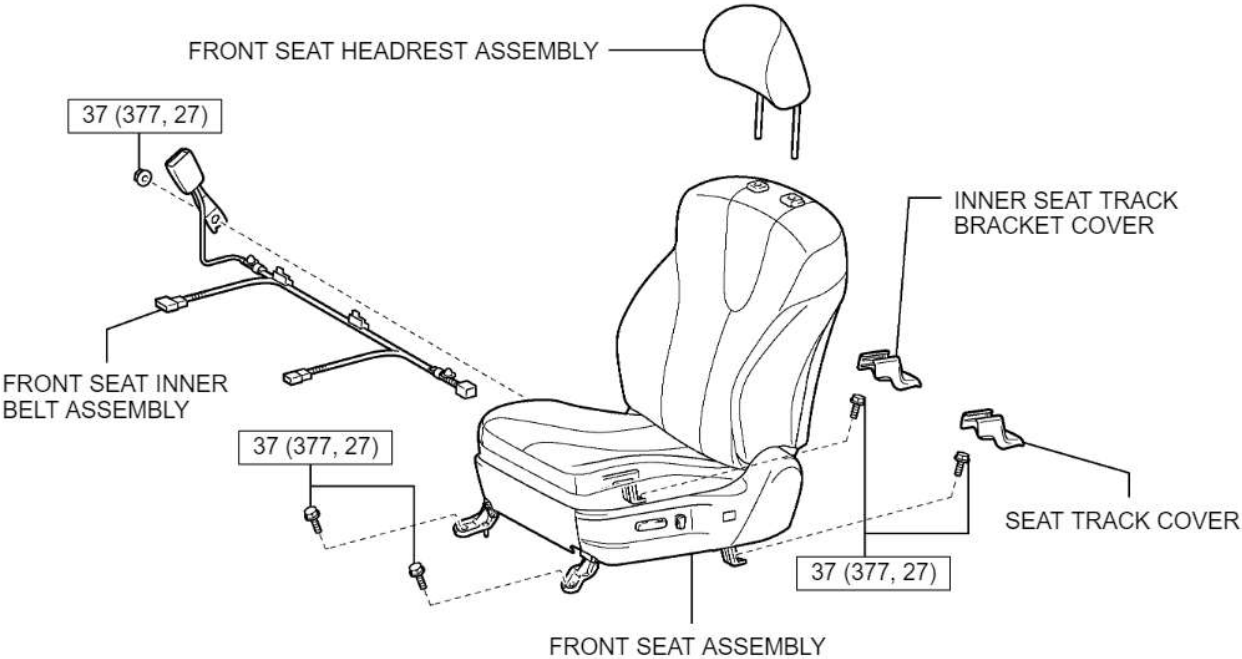


5. Front seat

for Manual Seat:

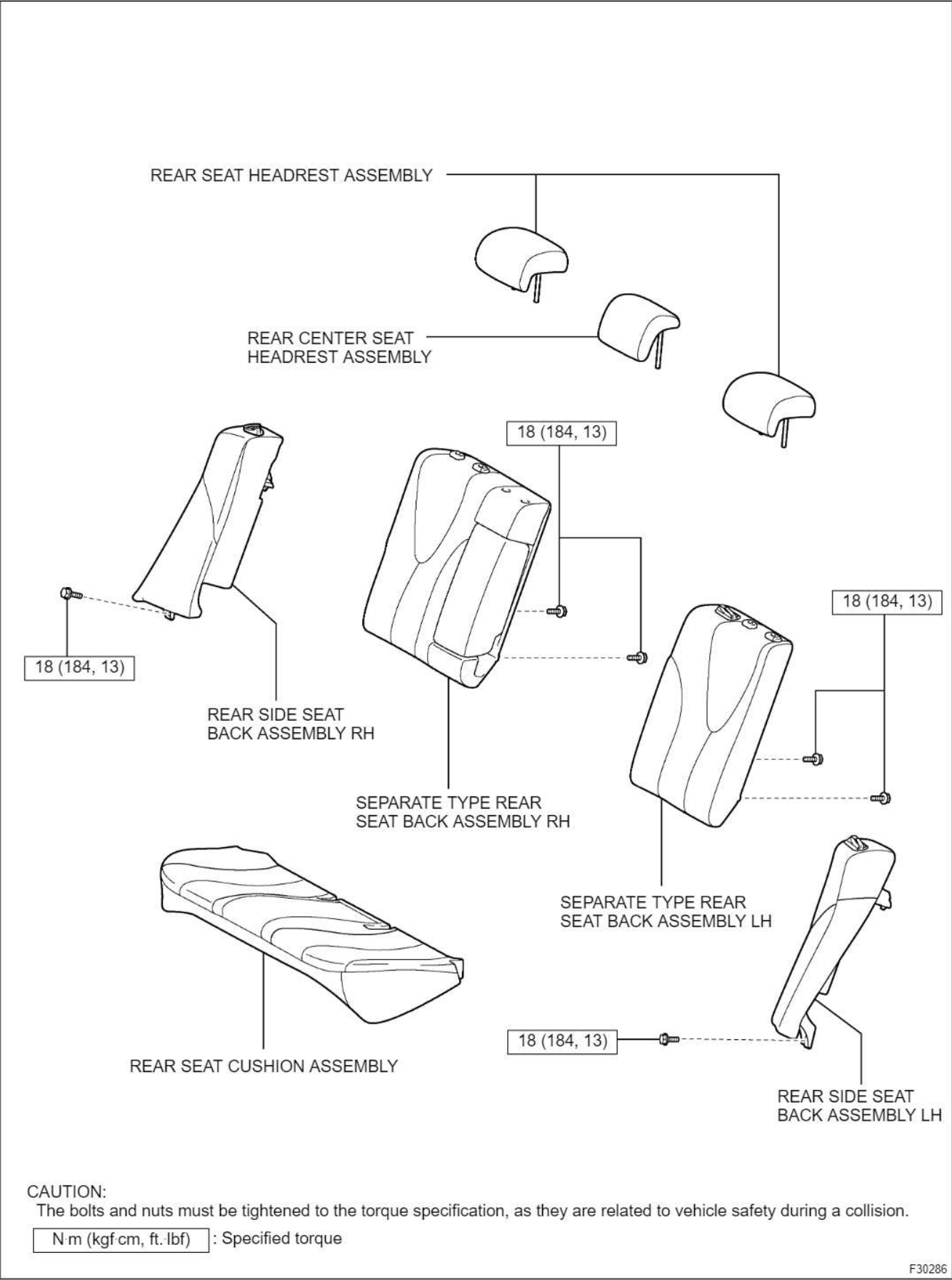


for Power Seat:



CAUTION:
The bolts and nuts must be tightened to the torque specification, as they are related to vehicle safety during a collision.
N·m (kgf·cm, ft. lbf) : Specified torque

6. Rear seat

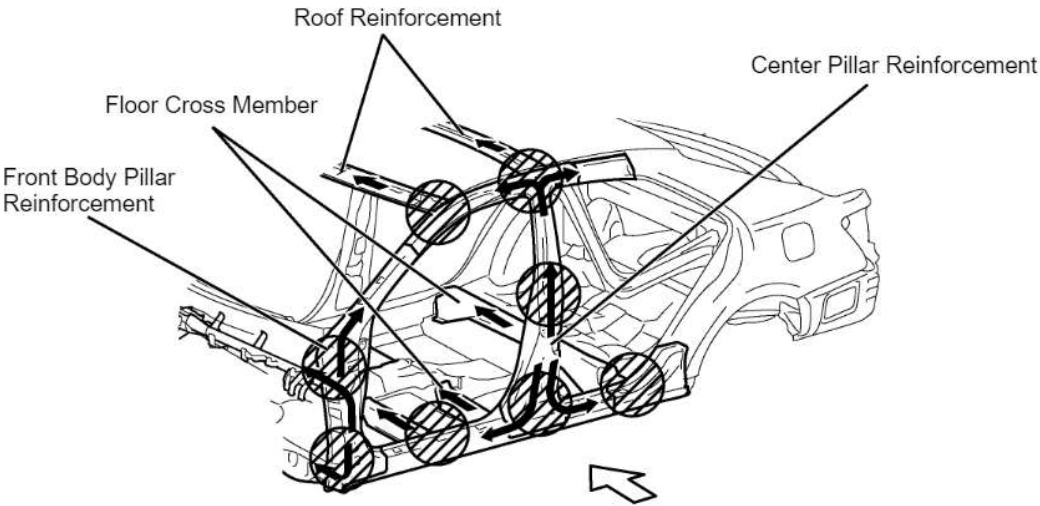
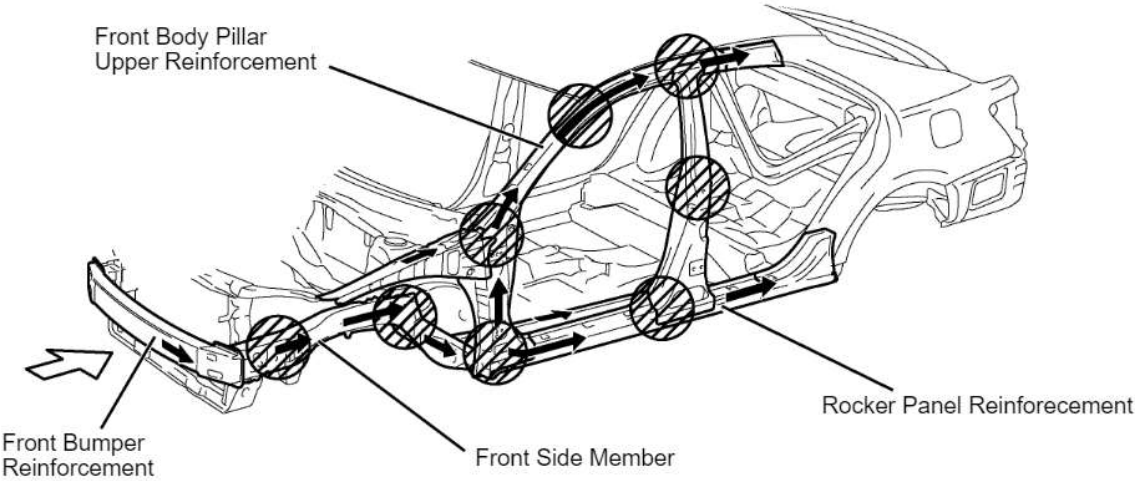


DAMAGE DIAGNOSIS

 Confirmation Point

 Collision Direction

 Collision Force Absorption Direction



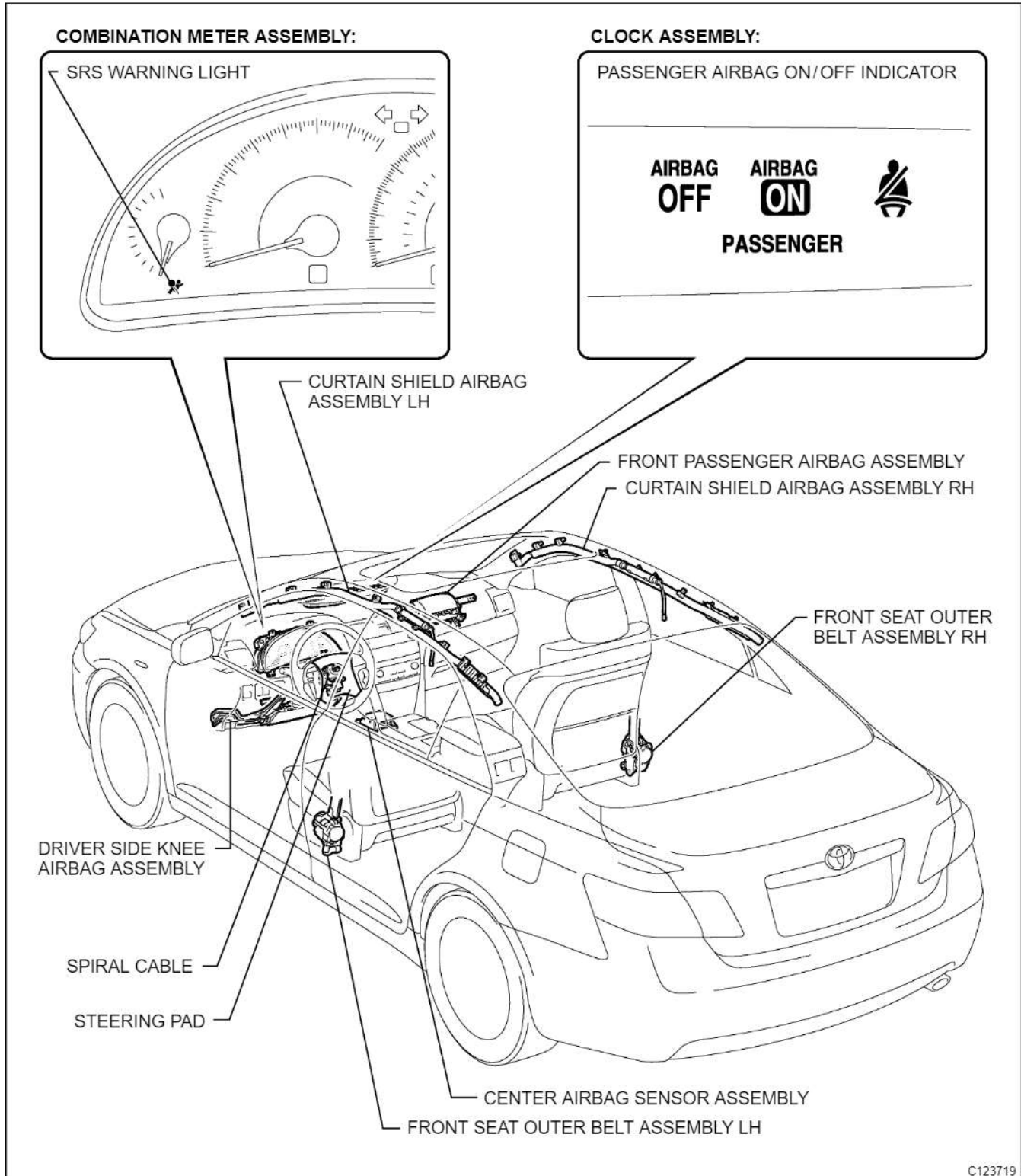
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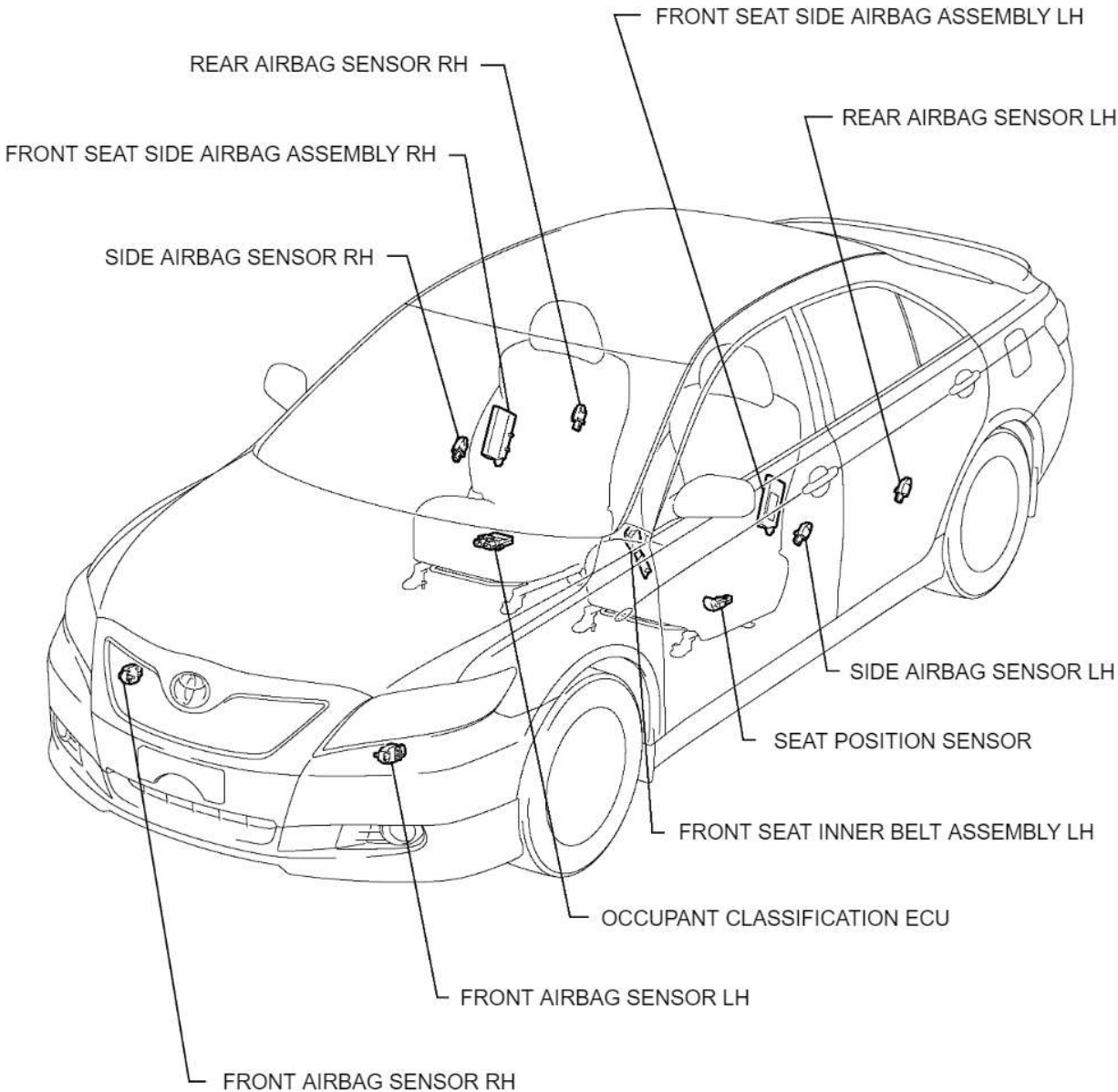
INTRODUCTION

DAMAGED VEHICLE DISPOSAL PRECAUTION (SRS AIRBAG SYSTEM)

For SRS airbag system adjustment methods, refer to the TOYOTA Repair Manual.

- (1) When using an electric welder, first remove all airbags and the seat belt pretensioner.
- (2) If impacts are likely to occur to the front airbag sensor, side airbag sensor, rear airbag sensor or seat position sensor, remove each sensor as necessary beforehand.
- (3) Do not allow the front airbag sensor, side airbag sensor, rear airbag sensor or seat position sensor to become heated to high temperatures.





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HANDLING PRECAUTIONS OF PLASTIC BODY PARTS

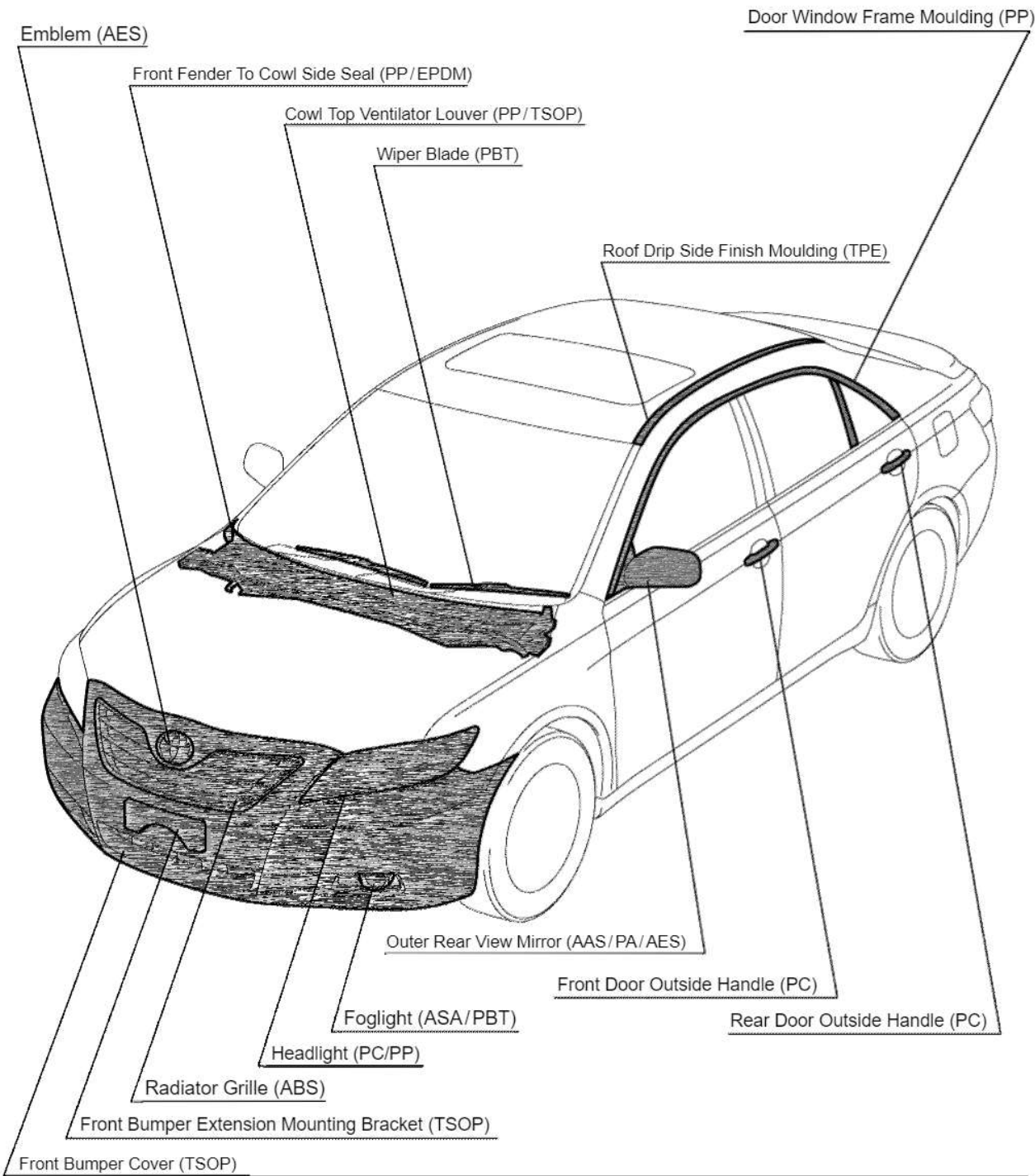
1. The repair procedure for plastic body parts must conform with the type of plastic material.
2. Plastic body parts are identified by the codes in the following table.
3. When repairing metal body parts adjoining plastic body parts (by brazing, frame cutting, welding, painting etc.), consideration must be given to the properties of the plastic.

Code	Material name	Heat* resistant temperature limit °C (°F)	Resistance to alcohol or gasoline	Notes
AAS	Acrylonitrile Acrylic Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid gasoline and organic or aromatic solvents.
ABS	Acrylonitrile Butadiene Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid gasoline and organic or aromatic solvents.
AES	Acrylonitrile Ethylene Styrene	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid gasoline and organic or aromatic solvents.
ASA	Acrylonitrile Styrene Acrylate	80 (176)	Alcohol is harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid gasoline and organic or aromatic solvents.
EPDM	Ethylene Propylene	100 (212)	Alcohol is harmless. Gasoline is harmless if applied only for short time in small amounts.	Most solvents are harmless but avoid dipping in gasoline, solvents, etc.
PA	Polyamide (Nylon)	80 (176)	Alcohol and gasoline are harmless.	Avoid battery acid.
PBT	Polybutylene Terephthalate	160 (320)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PC	Polycarbonate	120 (248)	Alcohol is harmless.	Avoid gasoline, brake fluid, wax, wax removers and organic solvents. Avoid alkali.
POM	Polyoxymethylene (Polyacetal)	100 (212)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PP	Polypropylene	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PMMA	Polymethyl Methacrylate	80 (176)	Alcohol is harmless if applied only for short time in small amounts.	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
PVC	Polyvinylchloride (Vinyl)	80 (176)	Alcohol and gasoline are harmless if applied only for short time in small amounts (e.g., quick wiping to remove grease).	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
TPO	Thermoplastic Olefine	80 (176)	Alcohol is harmless. Gasoline is harmless if applied only for short time in small amounts.	Most solvents are harmless but avoid dipping in gasoline, solvents, etc.
TSOP	TOYOTA Super Olefine Polymer	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.

*Temperatures higher than those listed here may result in material deformation during repair.

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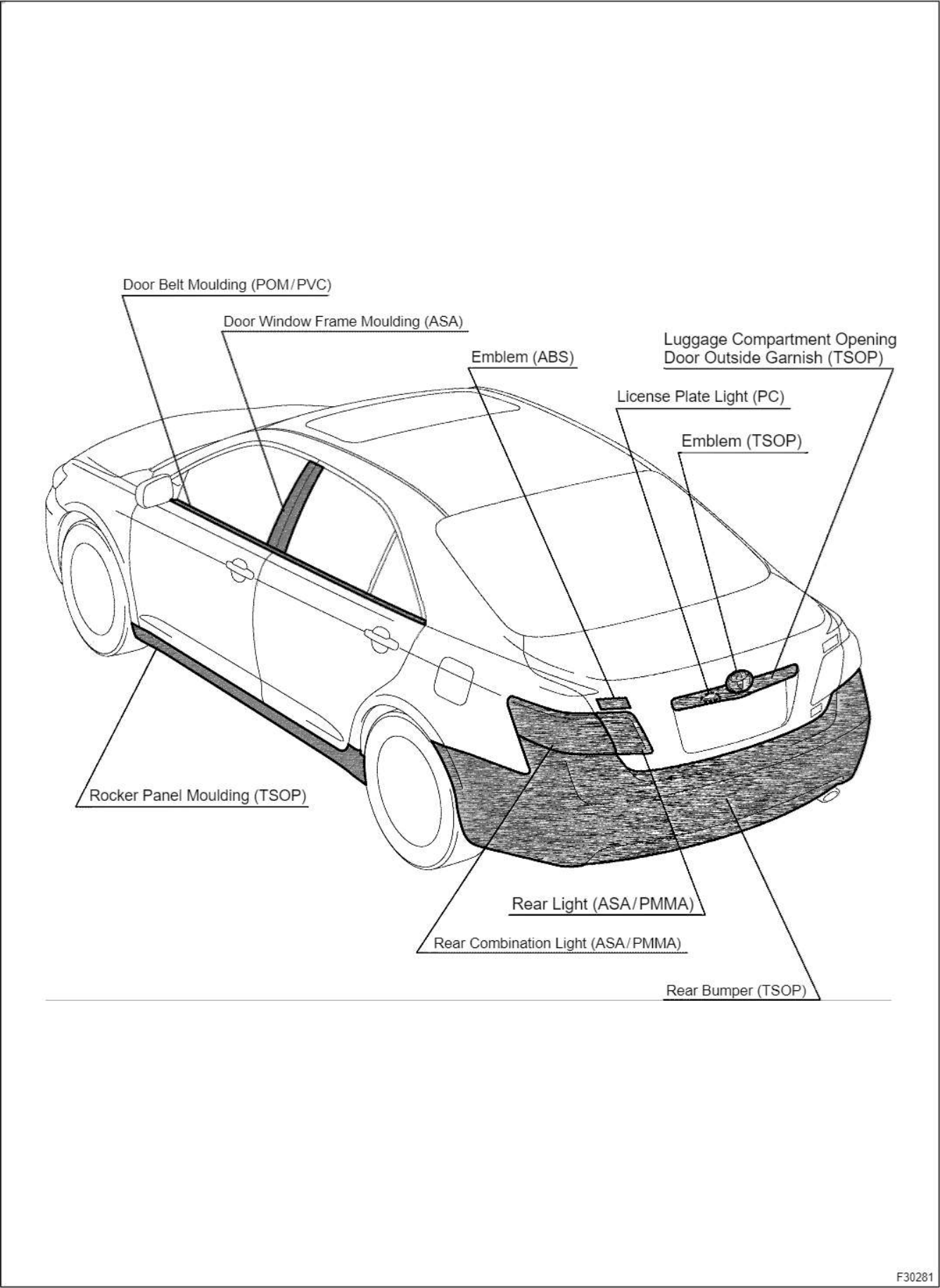
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INTRODUCTION



HANDLING PRECAUTIONS ON RELATED COMPONENTS

1. BRAKE SYSTEM

The brake system is one of the most important safety components. Always follow the directions and notes given in the brake section of the repair manual for the relevant model year when handling brake system parts.

NOTICE: When repairing the brake master cylinder or TRAC system, bleed the air out of the TRAC system.

2. DRIVE TRAIN AND CHASSIS

The drive train and chassis are components that can have great effects on the running performance and vibration resistance of the vehicle. After installing components in the sections listed in the table below, perform alignments to ensure correct mounting angles and dimensions. Body repair must be particularly accurate to ensure correct alignment.

HINT: Correct procedures and special tools are required for alignment. Always follow the directions given in the repair manual for the relevant model year during alignment and in section DI of this section.

Component to be aligned	Section of repair manual for relevant model
Front Wheels	Front Suspension section
Rear Wheels	Rear Suspension section

3. COMPONENTS ADJACENT TO THE BODY PANELS

Various types of component parts are mounted directly on or adjacently to the body panels. Strictly observe the following precautions to prevent damaging these components and the body panels during handling.

- Before repairing the body panels, remove their components or apply protective covers over the components.
- Before prying components off using a screwdriver or a scraper, etc., attach protective tape to the tool tip or blade to prevent damaging the components and the body paint.
- Before removing components from the outer surface of the body, attach protective tape to the body to ensure no damage to painted areas.

HINT: Apply touch-up paint to any damaged paint surfaces.

- Before drilling or cutting sections, make sure that there are no wires, etc., on the reverse side.

4. ECU (ELECTRONIC CONTROL UNIT)

Many ECUs are mounted in this vehicle.

Take the following precautions during body repair to prevent damage to the ECUs.

- Before starting electric welding operations, disconnect the negative (–) terminal cable from the battery.

When the negative (–) terminal cable is disconnected from the battery, the memory of the clock and audio systems will be erased. So, before starting work, make a record of the contents memorized by each memory system. Then when work is finished, reset the clock and audio systems as before.

When the vehicle has tilt and telescopic steering, power seats and outside rear view mirrors, which are all equipped with a memory function, it is not possible to make a record of the memory contents.

When the operation is finished, it will be necessary to explain this fact to the customer, and request the customer to adjust the features and reset the memory.

- Do not expose the ECUs to ambient temperatures above 80°C (176°F).

NOTICE: Since it is possible that the ambient temperature may reach 80°C (176°F) or more, remove the ECUs from the vehicle before starting work.

- Be careful not to drop the ECUs and not to apply physical shocks to them.

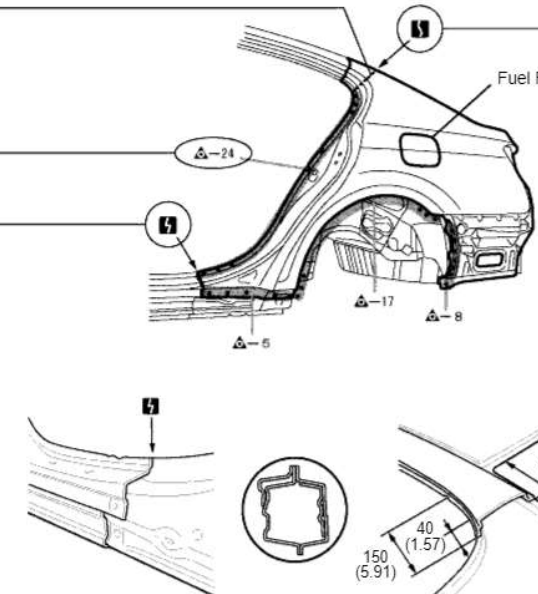
HOW TO USE THIS MANUAL

1. BODY PANEL REPLACEMENT THIS MANUAL

BODY PANEL REPLACEMENT
BP-34

(A) —————
QUARTER PANEL (CUT)

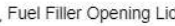
(B) 

(E) 

(C) With the body lower back panel removed.

(D) **Symbol meaning**
 : Remove Weld Points  : Cut and Join Location
 : Cut Location for Supply Parts

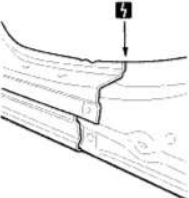
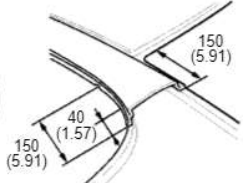
REMOVAL

(H) 

(G)  -24

(H) 

(E)  -5  -17  -8

mm (in.)

REMOVAL POINT

(F) 1. Remove the Fuel Filler Opening Lid at the same time.

(A) **REPLACEMENT PART AND METHOD**
QUARTER PANEL (CUT)

Replacement method
 (ASSY)...Assembly replacement
 (CUT)...Major cutting (less than 1/2 of part used)
 (CUT-H)...Half cutting (about 1/2 of part used)
 (CUT-P)...Partial cutting (most of part used)
 Replacement part

(G) **INSTALLATION OF WELD POINTS**
 Weld method and panel position symbols (See page IN-45)

(H) **SYMBOLS** (See page IN-43)

(B) **PART LOCATION**

(C) **REMOVAL CONDITIONS**

(D) **SYMBOL MEANING**

(E) **REMOVAL DIAGRAM**
 Describes in detail the removal of the damaged part involving repair by cutting.

(F) **REMOVAL GUIDE**
 Provides additional information to more efficiently help you perform the removal.

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INTRODUCTION

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BODY PANEL REPLACEMENT

Symbol meaning

M I : Mig Plug Weld	: Spot Weld
: Body Sealer	: Butt Weld

INSTALLATION

mm (in.)

POINT

1. Before temporarily installing the new parts, apply body sealer to the wheel arch.

HINT

- 1) Apply body sealer evenly about 5 mm (0.20 in.) from the flange, avoiding any oozing.
- 2) Apply sealer evenly, about 3 – 4 mm (0.12 – 0.16 in.) in diameter.

2. Temporarily install the new parts and measure each part of the new parts in accordance with the body dimension diagram. (See the body dimension diagram)
3. After welding, apply body sealer and undercoating to the corresponding parts.

① SYMBOLS

② INSTALLATION DIAGRAM

Describes in detail the installation to the new parts involving repair by welding and/or cutting, but excluding painting.

③ INSTALLATION GUIDE

Provides additional information to more efficiently help you perform the installation.

④ SYMBOLS (See page IN-43)

⑤ INSTALLATION OF WELD POINTS (See page IN-45)

Weld method and panel position symbols

⑥ PART NAME

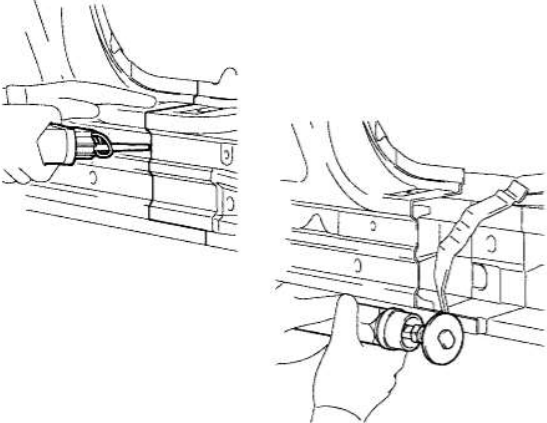
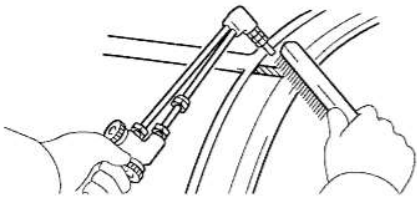
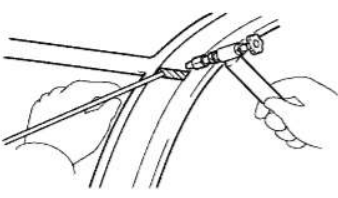
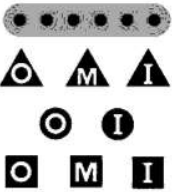
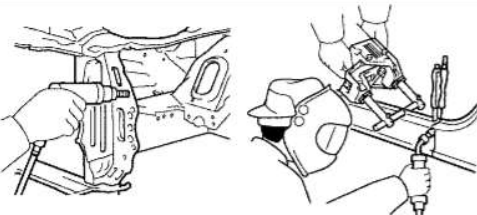
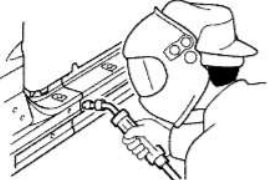
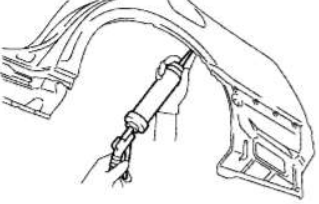
F33026

INTRODUCTION

IN-43

2. SYMBOLS

The following symbols are used in the welding diagrams in section BP of this manual to indicate cutting areas and the types of weld required.

SYMBOLS	MEANING	SYMBOLS	MEANING	ILLUSTRATION
-----	CUT		CUT AND JOIN LOCATION (Saw Cut)	
			CUT AND JOIN LOCATION (Cut Location for Supply Parts)	
			CUT LOCATION	
			CUT WITH DISC SANDER ETC.	
////	BRAZE		BRAZE (Removal)	
oooo	BRAZE		BRAZE (Installation)	
	WELD POINTS	—	SPOT WELD OR MIG PLUG WELD	
++++	WELDING	 	CONTINUOUS MIG WELD (BUTT WELD) CONTINUOUS MIG WELD (TACK WELD)	
	SEALER		BODY SEALER	

F33004

IN-44

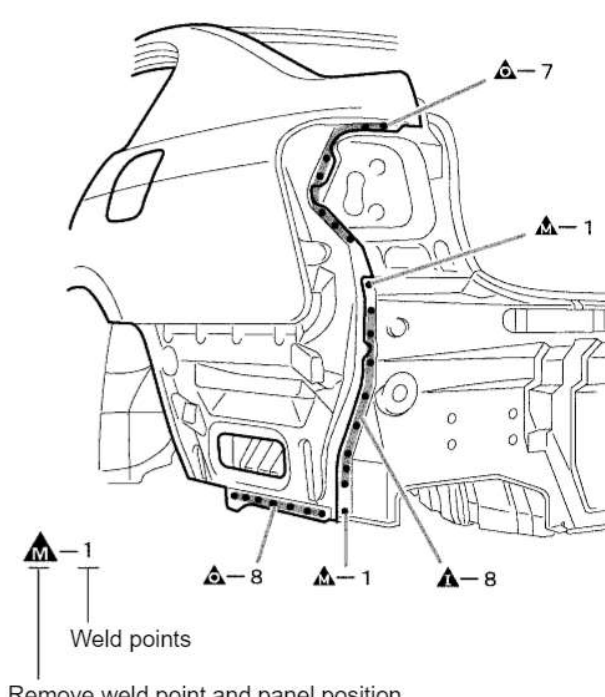
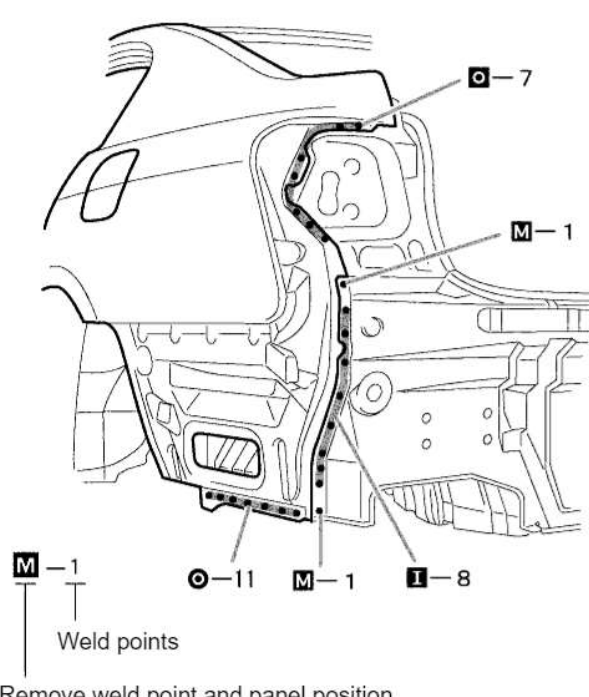
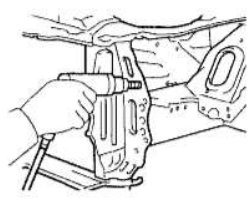
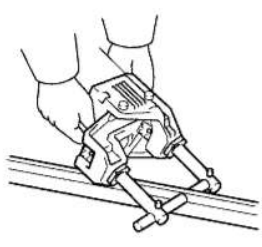
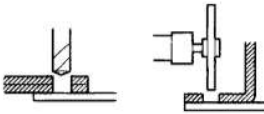
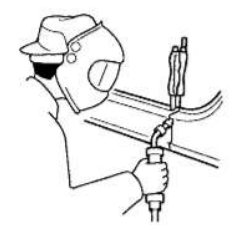
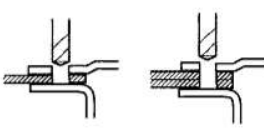
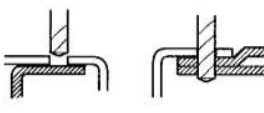
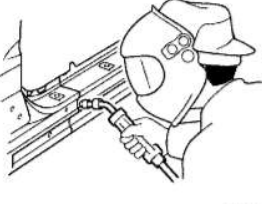
INTRODUCTION

SYMBOLS	MEANING	SYMBOLS	MEANING	ILLUSTRATION
—			Assembly Mark	—
	—	—	BODY SEALER (Flat Finishing)	
	—		BODY SEALER (Flat Finishing)	

F33005

3. ILLUSTRATION OF WELD POINT SYMBOLS

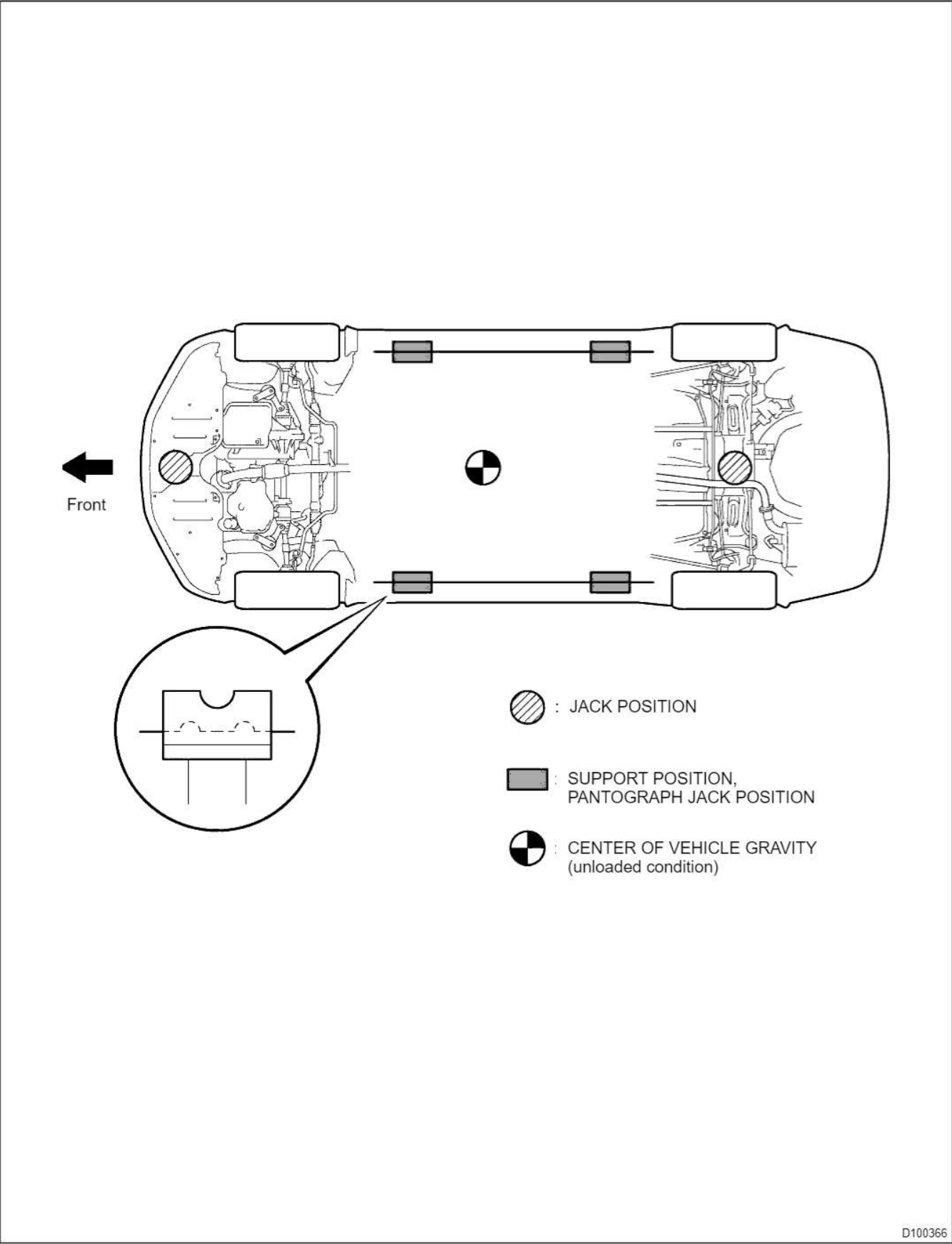
EXAMPLE:

REMOVAL			INSTALLATION		
					
SYMBOLS	MEANING	ILLUSTRATION	SYMBOLS	MEANING	ILLUSTRATION
	Remove Weld Points			Spot Weld	
	(Outside)			MIG Plug Weld	
	(Middle)				
	(Inside)			Spot MIG Weld	

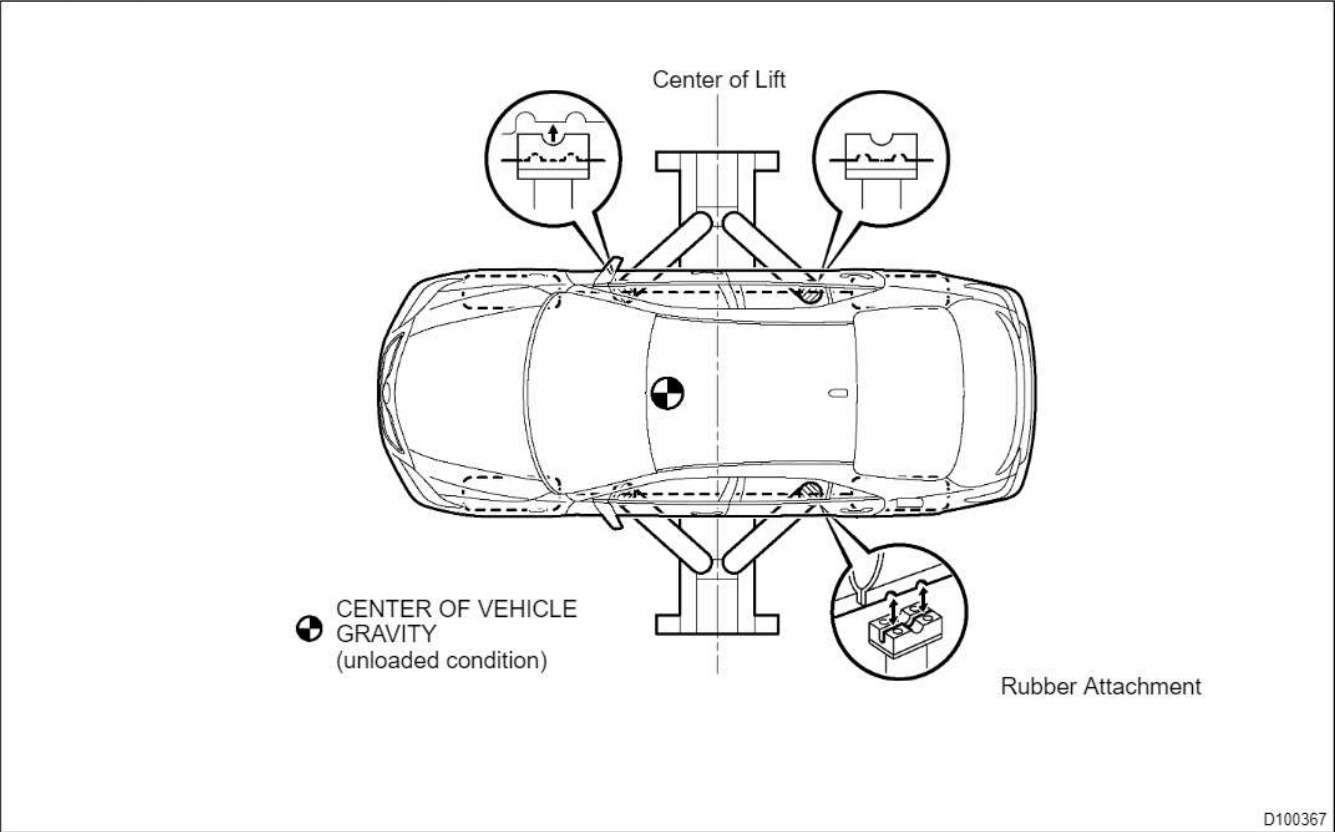
F33006

NOTICE ABOUT VEHICLE CONDITION WHEN JACKING UP VEHICLE

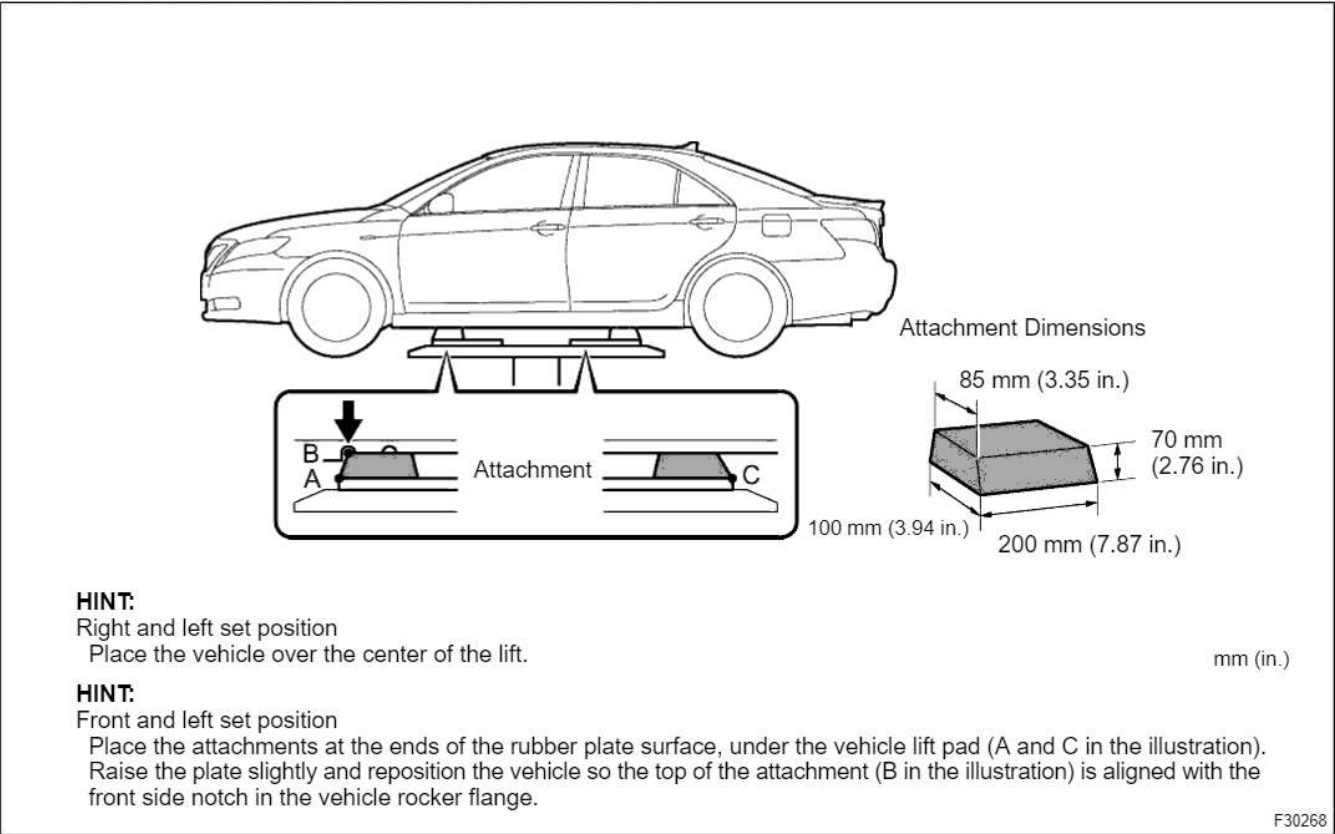
1. NOTICE FOR USING JACK AND SAFETY STAND



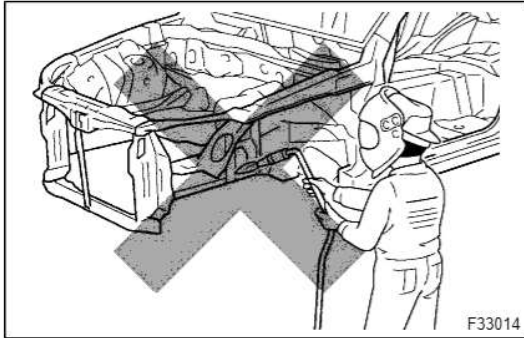
2. NOTICE FOR USING SWING ARM TYPE LIFT



3. NOTICE FOR USING PLATE TYPE LIFT



PRECAUTIONS FOR REPAIRING BODY STRUCTURE PANELS



1. HEAT REPAIR FOR BODY STRUCTURE PANELS

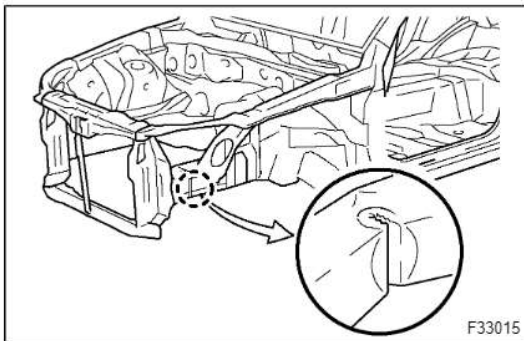
Toyota prohibits the use of the heat repair method on body structure panels when repairing a vehicle damaged in a collision.

Panels that have high strength and rigidity, as well as a long life span for the automobile body are in high demand.

At Toyota, in order to fulfill these requirements, we use high tensile strength steel sheets and rust preventive steel sheets on the body. High tensile steel sheets are made with alloy additives and a special heat treatment in order to improve their strength.

To prevent the occurrence of rust for a long period of time, the surface of the steel is coated with a zinc alloy.

If body structure parts are heat repaired with an acetylene torch or other heating source, the crystalline organization of the steel sheet will change and their strength of the steel sheet will be reduced. The ability of the body to resist rust is significantly lowered as well since the rust resistant zinc coating is destroyed by heat and the steel sheet surface is oxidized.



2. STRUCTURE PANEL KINKS

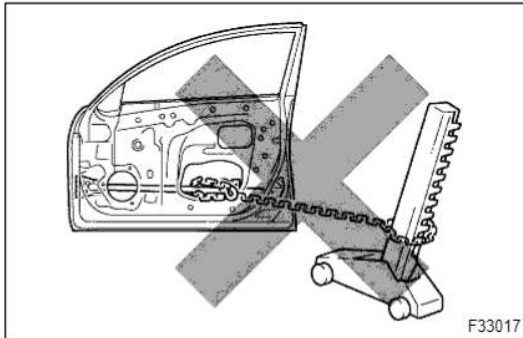
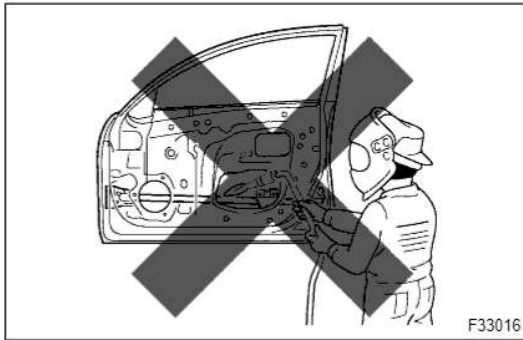
A sharp deformation angle on a panel that cannot be returned to its original shape by pulling or hammering is called a kink.

Structural parts are designed to perform in their original shape. If parts are deformed in an accident, or if the deformed parts are repaired and reused, the parts may be unable to perform as intended.

It is necessary to replace the part where the kink has occurred.

INTRODUCTION

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3. IMPACT BEAM REPAIR

The impact beam and bracket are necessary and important parts that help reduce the probability of injury to passengers in side collisions.

For impact beams, we use special high tensile strength steel.

The high tensile strength steel maintains its special crystalline organization by heat treatment or alloy additives.

Structural parts are designed to perform in their original shape. If parts are deformed in an accident, or if the deformed parts are repaired and reused, the parts may be unable to perform as intended.

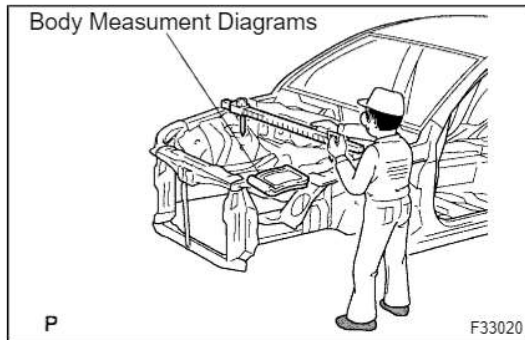
If the impact beam or bracket is damaged, replace the door assembly that has the damaged beam.

Also, the bumper reinforcement is a necessary and important part that helps reduce the probability of injury to passengers in front collisions, and for the same reasons explained above, should be replaced if damaged.

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INTRODUCTION

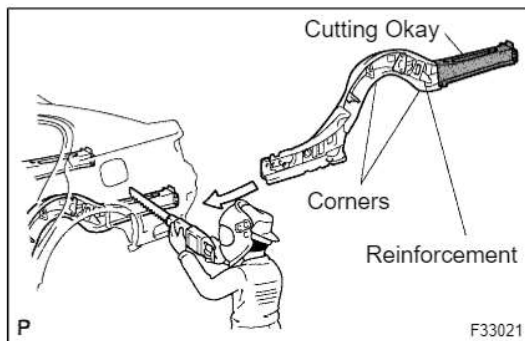
PROPER AND EFFICIENT WORK PROCEDURES



1. REMOVAL

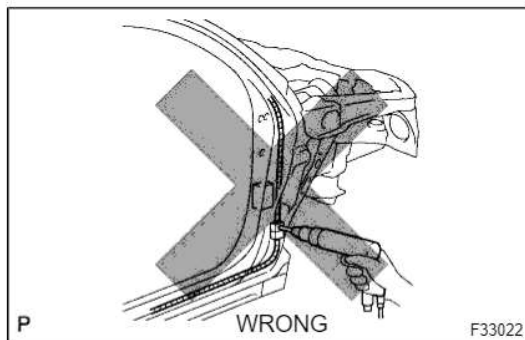
(a) PRE-REMOVAL MEASURING

- (1) Before removal or cutting operations, take measurements in accordance with the dimensions diagram. Always use a puller to straighten a damaged body or frame.



(b) CUTTING AREA

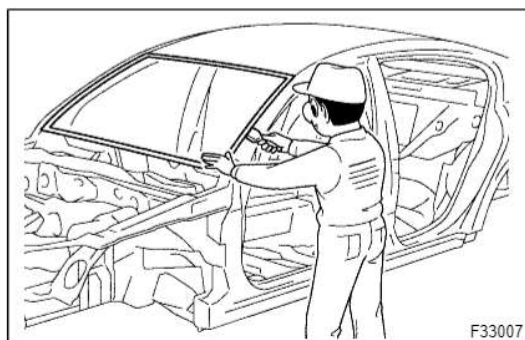
- (1) Always cut in a straight line and avoid cutting reinforced areas.



(c) PRECAUTIONS FOR DRILLING OR CUTTING

- (1) Check behind any area to be drilled or cut to ensure that there are no hoses, wires, etc., that may be damaged.

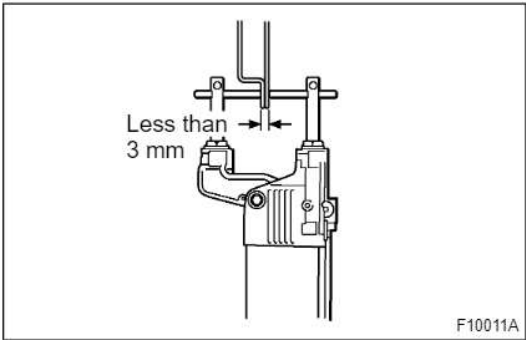
HINT: See "Handling Precautions on Related Components" on page IN-17.



(d) REMOVAL OF ADJACENT COMPONENTS

- (1) When removing adjacent components, apply protective tape to the surrounding body and your tools to prevent damage.

HINT: See "Handling Precautions on Related Components" on page IN-17.

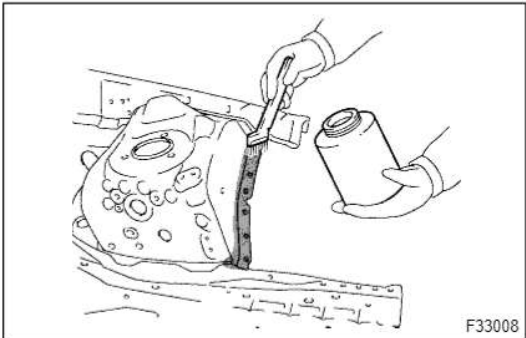


2. PREPARATION FOR INSTALLATION

(a) SPOT WELD POINTS

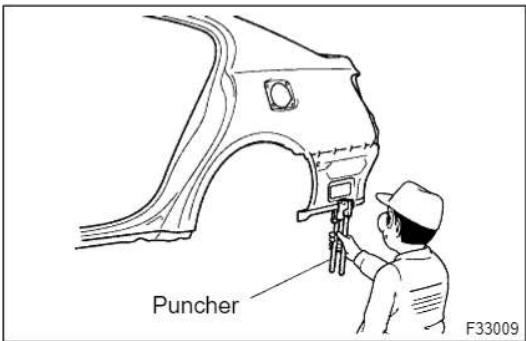
- (1) When welding panels with a combined thickness of over 3 mm (0.12 in.), use a MIG (Metal Inert Gas) welder for plug welding.

HINT: Spot welding does not provide sufficient durability for panels with a combined thickness of over 3 mm (0.12 in.)



(b) APPLICATION OF WELD-THROUGH PRIMER (SPOT SEALER)

- (1) Remove the paint from the portion of the new parts and body to be welded, and apply weld-through primer.

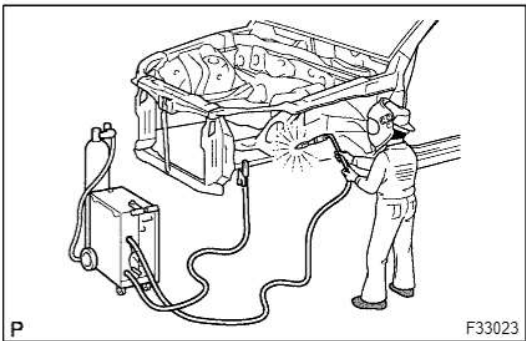


(c) MAKING HOLES FOR PLUG WELDING

- (1) For areas where a spot welder cannot be used, use a puncher or drill to make holes for plug welding.

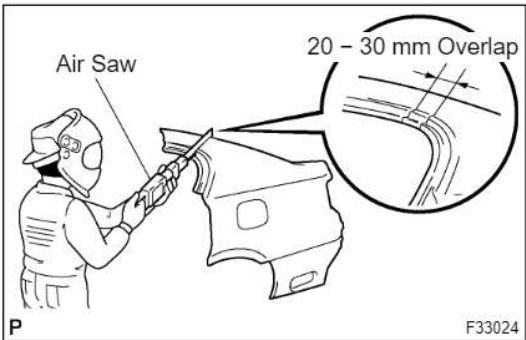
REFERENCE: mm (in.)

Thickness of welded portion	Size of plug hole
1.0 (0.04) under	ø 5 (0.20) over
1.0 (0.04) – 1.6 (0.06)	ø 6.5 (0.26) over
1.7 (0.07) – 2.3 (0.09)	ø 8 (0.31) over
2.4 (0.09) over	ø 10 (0.39) over



(d) SAFETY PRECAUTIONS FOR ELECTRICAL COMPONENTS

- (1) When welding, there is a danger that electrical components will be damaged by the electrical current flowing through the body.
- (2) Before starting work, disconnect the negative terminal of the battery and ground the welder near the welding location of the body.

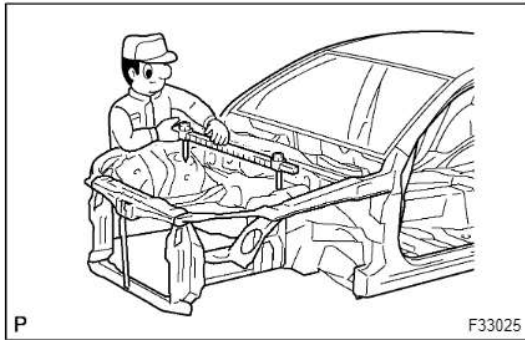


(e) ROUGH CUTTING OF JOINTS

- (1) For joint areas, rough cut the new parts, leaving 20 – 30 mm (0.79 – 1.18 in.) of overlap.

IN-14

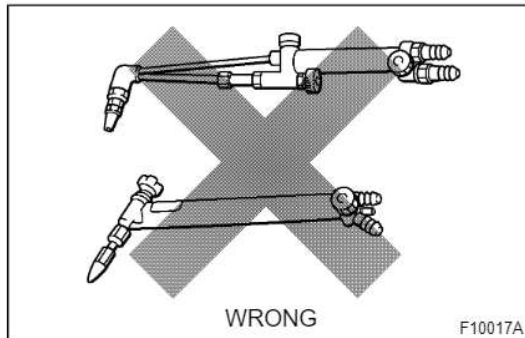
INTRODUCTION



3. INSTALLATION

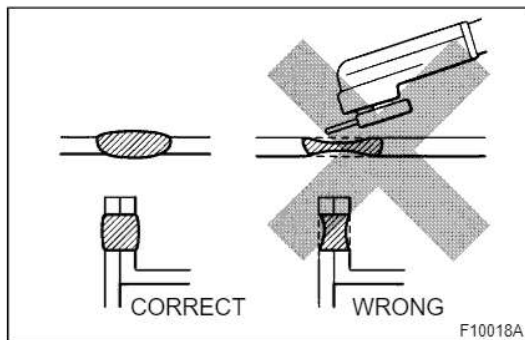
(a) PRE-WELDING MEASUREMENTS

- (1) Always take measurements before installing underbody or engine components to ensure correct assembly. After installation, confirm proper fit.



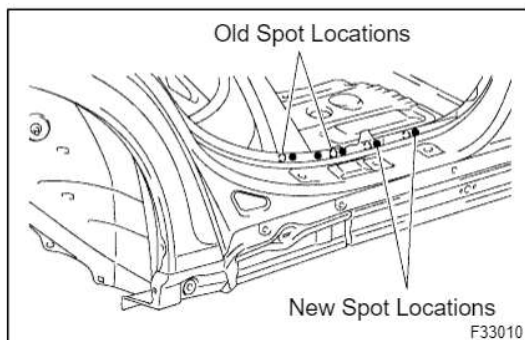
(b) WELDING PRECAUTIONS

- (1) The number of welding spots should be as follows.
Spot weld: 1.3 X No. of manufacturer's spots.
Plug weld: More than No. of manufacturer's plugs.
- (2) Plug welding should be done with a MIG (Metal Inert Gas) welder. Do not gas weld or braze panels at areas other than where specified.



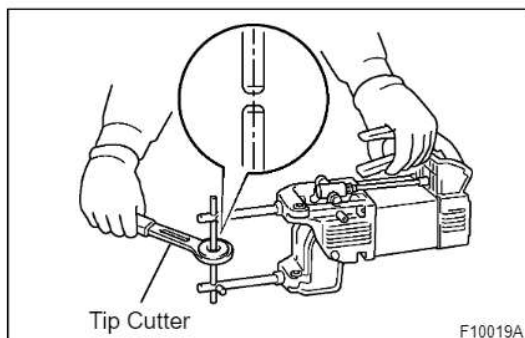
(c) POST-WELDING REFINISHING

- (1) Always check the welded spots to ensure that they are secure.
- (2) When smoothing out the weld spots with a disc grinder, be careful not to grind off too much as this will weaken the weld.



(d) SPOT WELD LOCATIONS

- (1) Avoid welding over previously welded areas.

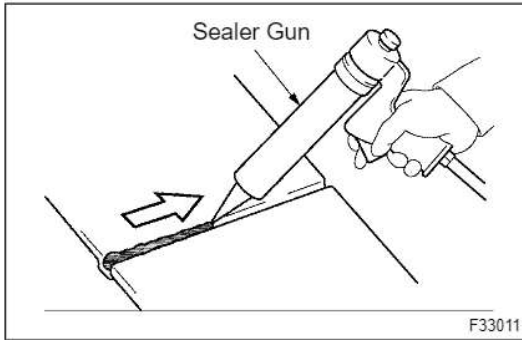


(e) SPOT WELDING PRECAUTIONS

- (1) The shape of the tip point of the spot welder significantly affects the strength of the weld. Therefore, maintain the tip point in the proper shape, and allow it to cool after every five or six spots.
- (2) Completely remove the paint from the areas to be spot welded, including the seams and the surfaces that come in contact with the welding tip.
- (3) Use a sander to remove any burrs that are created during spot welding.

INTRODUCTION

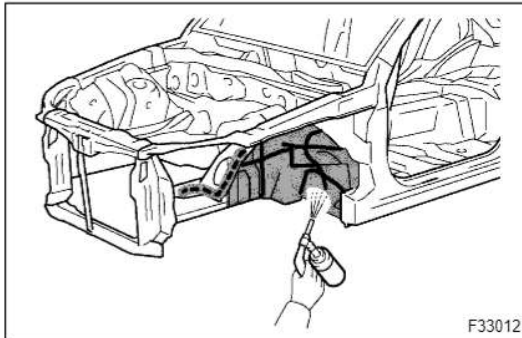
IN-15



4. ANTI-RUST TREATMENT AFTER INSTALLATION (BEFORE PAINTING PROCESS)

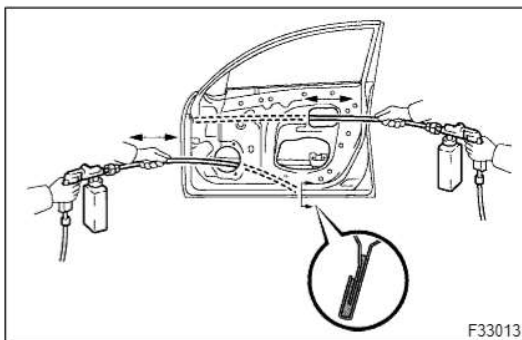
(a) BODY SEALER APPLICATION

- (1) For water-proofing and anti-corrosion measures, always apply the body sealer to the body panel seams and hems of the doors, hood, etc.



(b) UNDERCOAT APPLICATION

- (1) To prevent corrosion and protect the body from damage by flying stones, always apply sufficient undercoating to the bottom surface of the under body and inside of the wheel housings.



5. ANTI-RUST TREATMENT AFTER INSTALLATION (AFTER PAINTING PROCESS)

(a) ANTI-RUST AGENT (WAX) APPLICATION

- (1) To preserve impossible to paint areas from corrosion, always apply sufficient anti-rust agent (wax) to the inside of the hemming areas of the doors and hood, and around the hinges, or the welded surfaces inside the box-shaped cross sections of the side members, body pillars, etc.

6. ANTI-RUST TREATMENT BY PAINTING

REFERENCE:

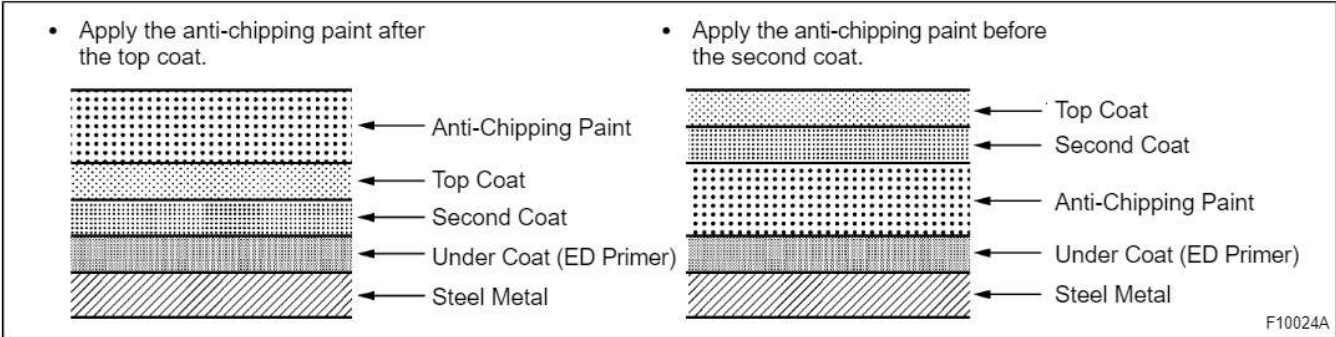
Painting prevents corrosion and protects the sheet metal from damage. In this section, anti-chipping paint only for anti-corrosion purposes is described.

(a) ANTI-CHIPPING PAINT

- (1) To prevent corrosion and protect the body from damage by flying stones, etc., apply anti-chipping paint to the rocker panel, wheel arch areas, balance panel, etc.

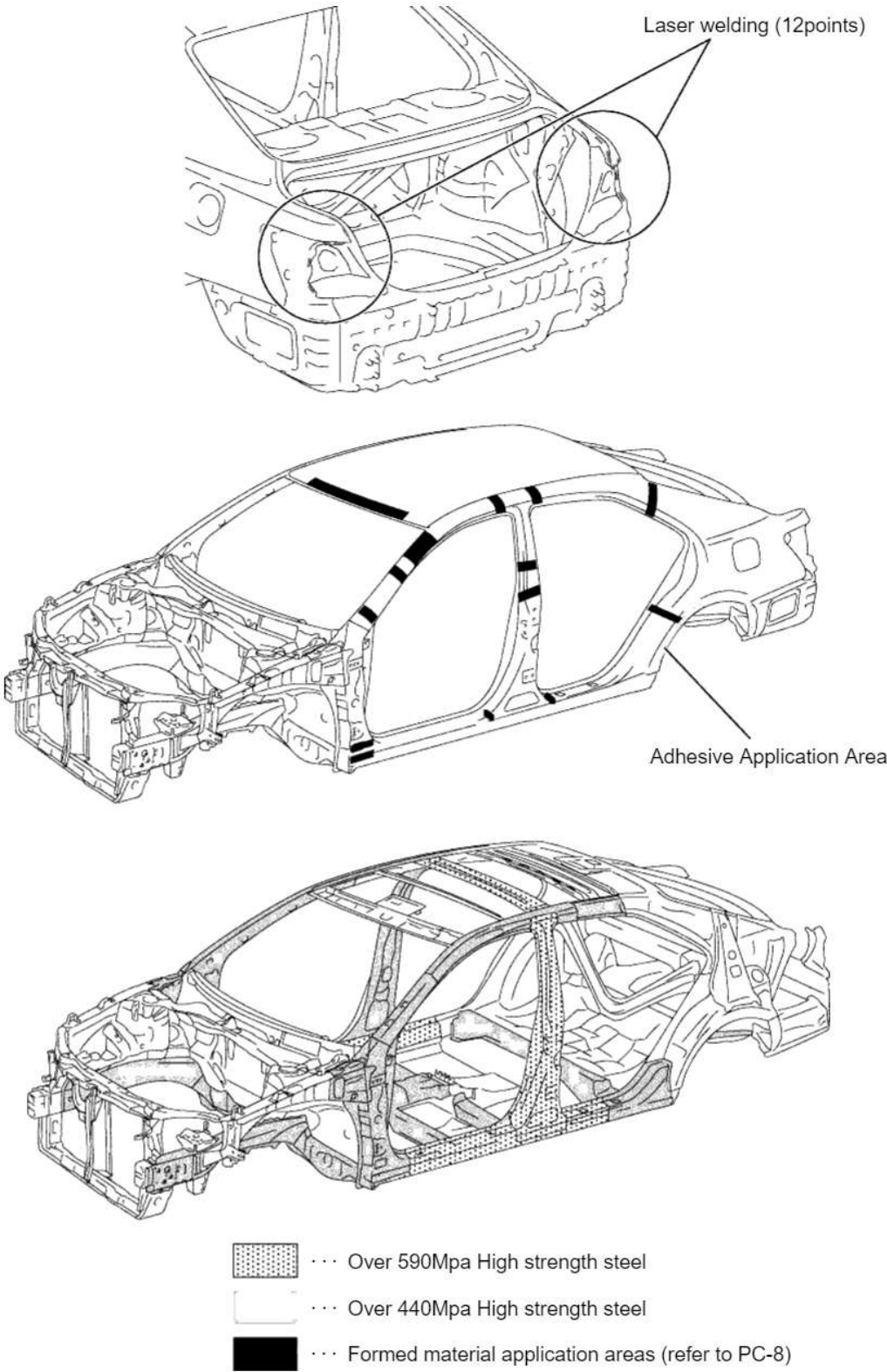
HINT:

Depending on the model or the application area, there are cases where the application of anti-chipping paint is necessary before the second coat or after the top coat.



ABOUT THIS VEHICLE

STRUCTUAL OUTLINE



F30267

ABOUT THIS MANUAL

Scope of the repair work explanation

- This text explains the welding panel replacement instructions from the vehicle's white body condition. We have abbreviated the explanations of the removal and reinstallation of the equipment parts up to the white body condition and of the installation, inspection, adjustment and final inspection of equipment parts after replacing the weld panel.

Section categories

- This manual has been divided as shown below.

Section Title	Contents	Examples
INTRODUCTION	Explanation of general body repair. Views of weld panel replacement instructions.	Cautionary items. Views of weld panel replacement instructions.
BODY PANEL REPLACEMENT	Instructions for replacing the weld panels from the white body condition, from which bolted parts have been removed, with individual supply parts.	Front side member replacement. Quarter panel replacement.
BODY DIMENSIONS	Body aligning measurements.	Dimension diagrams.
PAINT • COATING	Scope and type of anti-rust treatment, etc. together with weld panel replacement.	Under coating. Body sealer.

Contents omitted in this manual.

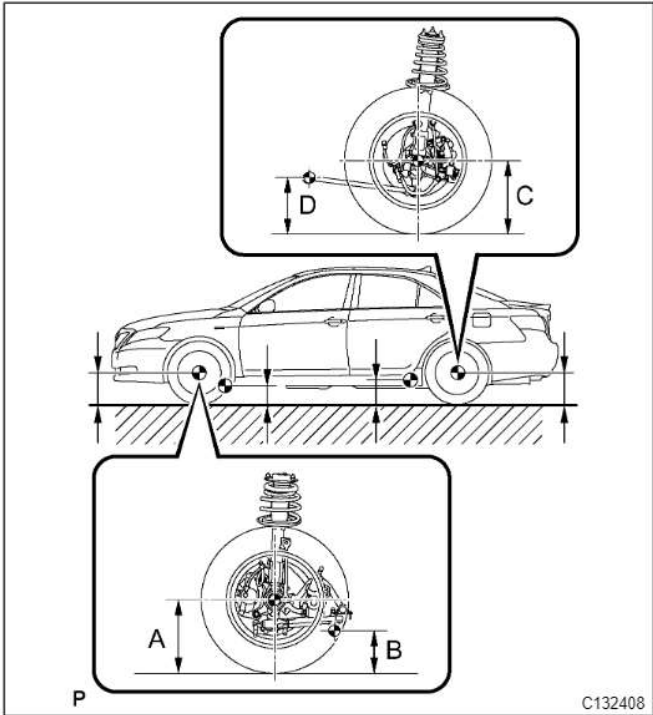
- Make sure to perform the following essential procedures, although they are omitted in this manual.
 - (1) Clean and wash removed parts, if necessary.
 - (2) Visual inspection.

WHEEL ALIGNMENT STANDARD

1. FRONT WHEEL ALIGNMENT

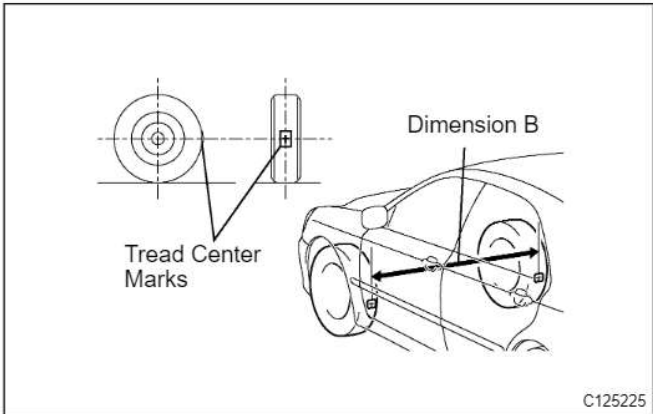
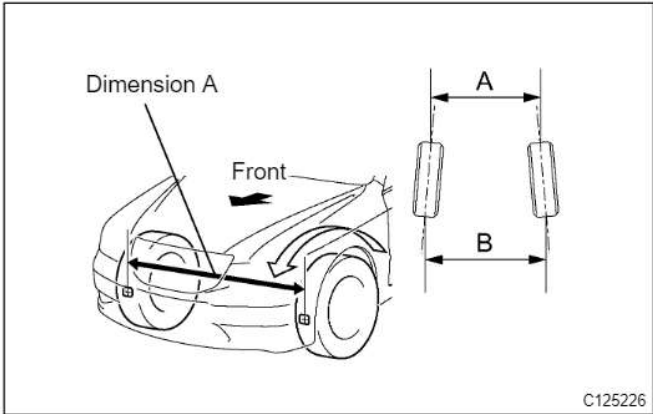
Standard vehicle height:

Front A – B	Rear C – D
129 mm (5.08 in.)	56 mm (2.20 in.)



Standard toe-in (total):

Toe-in (total)	—
A – B:	0 + -2 mm (0 + -0.08 in.)

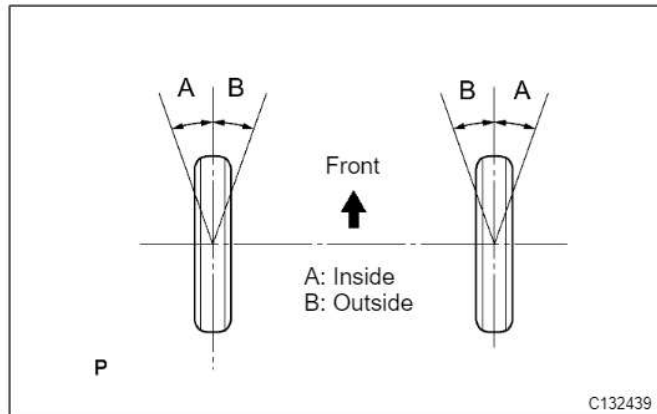


IN-40

INTRODUCTION

Standard wheel angle:

Inside wheel	Outside wheel (reference)
$38^{\circ}22' + - 2^{\circ}$ ($38.37^{\circ} + - 2^{\circ}$)	$33^{\circ}33'$ (33.55°)

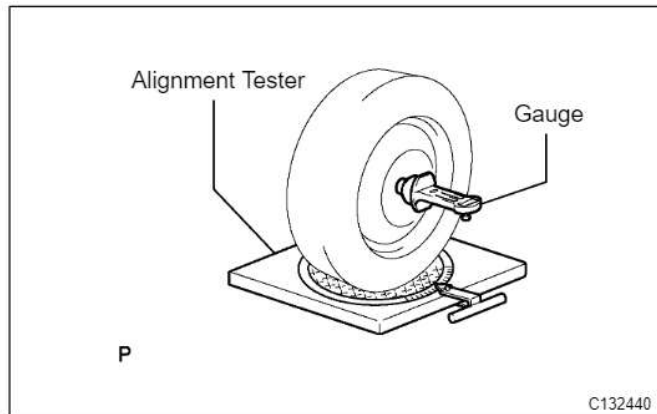


Standard camber inclination:

Camber	Right-left difference
$-0^{\circ}40' + - 45'$ ($-0.67^{\circ} + - 0.75^{\circ}$)	45' (0.75°) or less

Standard caster inclination:

Caster	Right-left difference
$2^{\circ}55' + - 45'$ ($-2.92^{\circ} + - 0.75^{\circ}$)	45' (0.75°) or less



Steering axis inclination:

Steering axis inclination	Right-left difference
$12^{\circ}15' + - 45'$ ($12.25^{\circ} + - 0.75^{\circ}$)	45' (0.75°) or less

2. REAR WHEEL ALIGNMENT

Standard toe-in:

Toe-in (total)	—
A + B:	$0^{\circ} + - 24'$ ($0^{\circ} + - 0.4^{\circ}$)
C - D:	$4 + - 2$ mm ($0.16 + - 0.08$ in.)

Standard camber inclination:

Camber	Right-left difference
$-1^{\circ}20' + - 45'$ ($-1.33^{\circ} + - 0.75^{\circ}$)	45' (0.75°) or less

