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NOTE: This manual has references to the TOYOTA CAMRY / AURION Repair Manual's heater & air conditioning system, body electrical and suspension & axle sections.

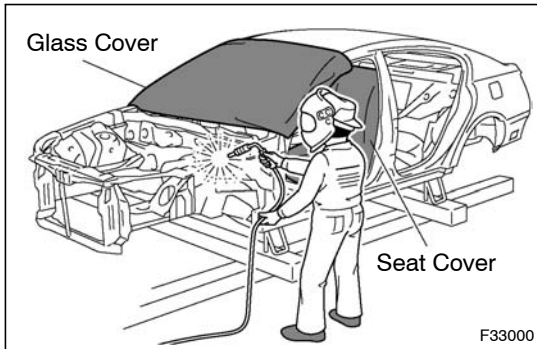
PRECAUTION

GENERAL REPAIR INSTRUCTIONS

1. WORK PRECAUTIONS

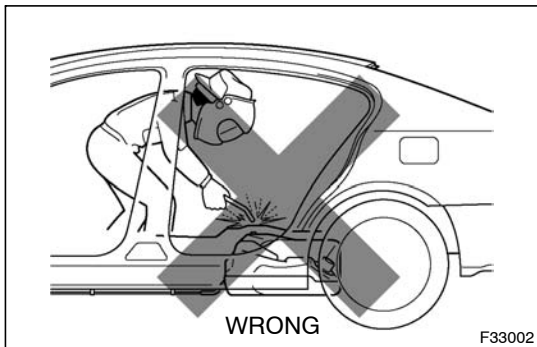
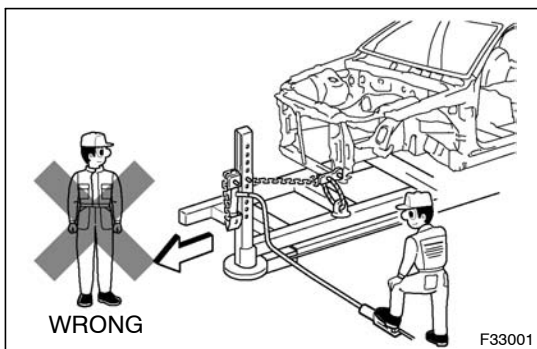
(a) Vehicle protection

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



(b) Safety

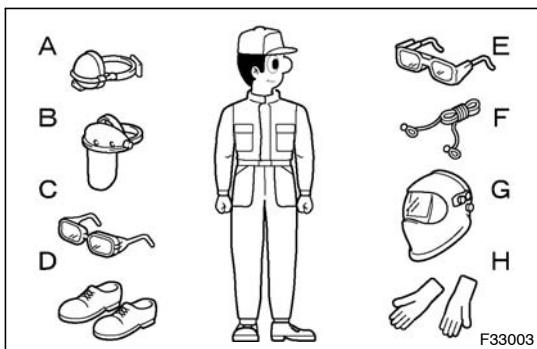
- (1) Never stand in a direct line with the chain when using a puller on the body or frame, and be sure to attach a safety cable.



- (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.

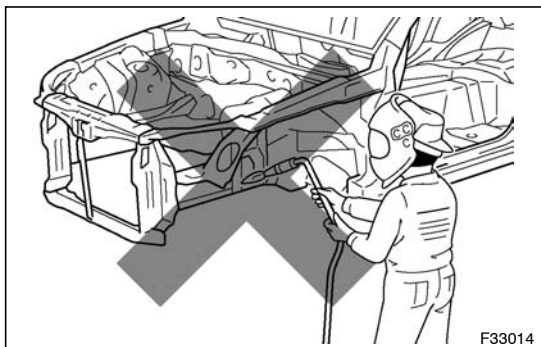
(c) Safety work clothes

- (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

PRECAUTIONS FOR REPAIRING BODY STRUCTURE PANELS



1. HEAT REPAIR FOR BODY STRUCTURE PANELS

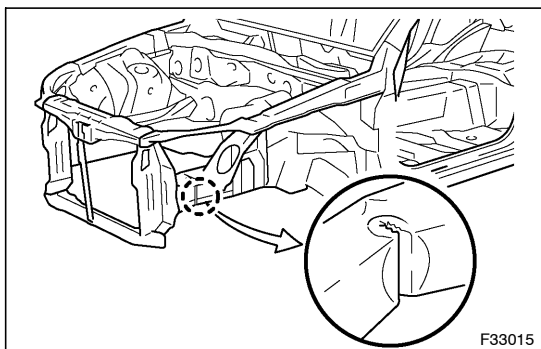
Toyota prohibits the use of the heat repair method on body structure panels when repairing a vehicle damaged in a collision.

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 organisation of the steel sheet will change and the 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 oxidised.

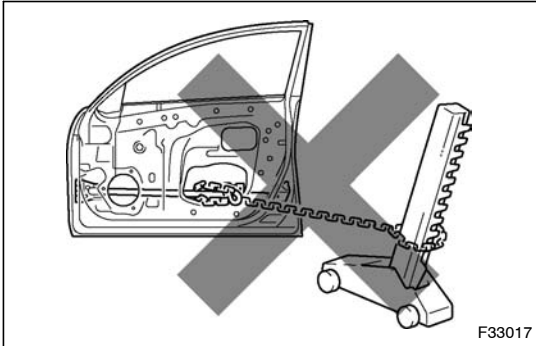
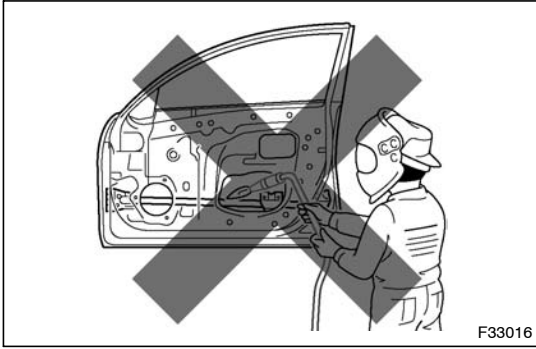


2. STRUCTURE PANEL KINKS

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.



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.

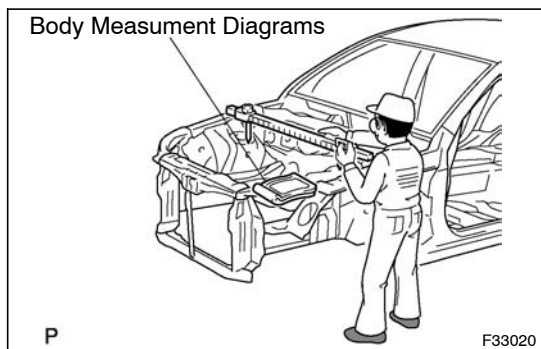
The high tensile strength steel maintains its special crystalline organisation by heat treatment or alloy additives.

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.

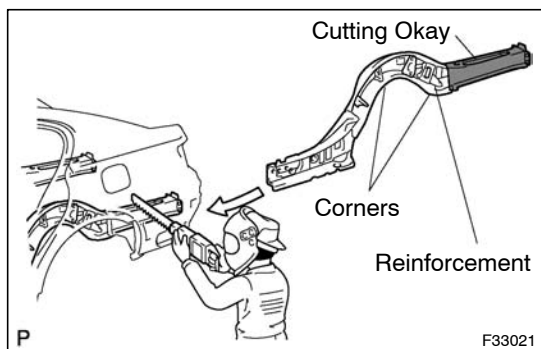
PROPER AND EFFICIENT WORK PROCEDURES



1. REMOVAL

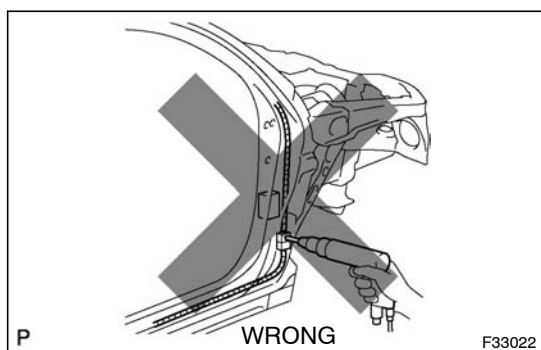
(a) Pre-removal measuring

- (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

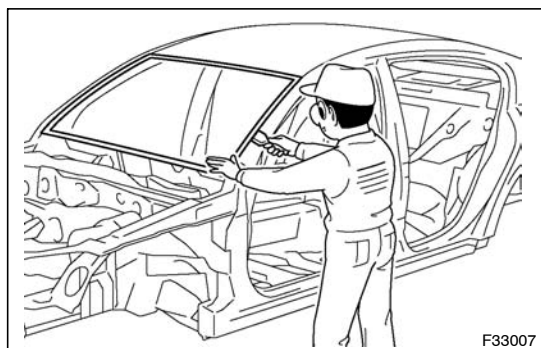
- (1) Always cut in a straight line and avoid cutting reinforced areas.



(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.

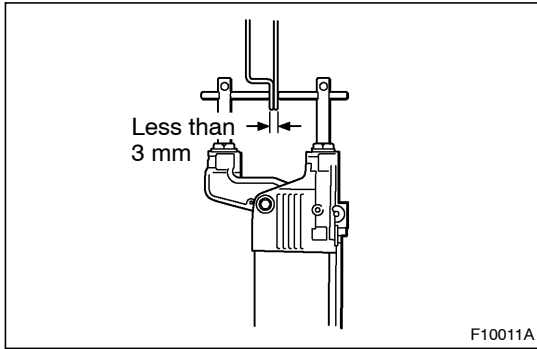
HINT: See "Handling Precautions on Related Components" on page [IN-9](#).



(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-9](#).

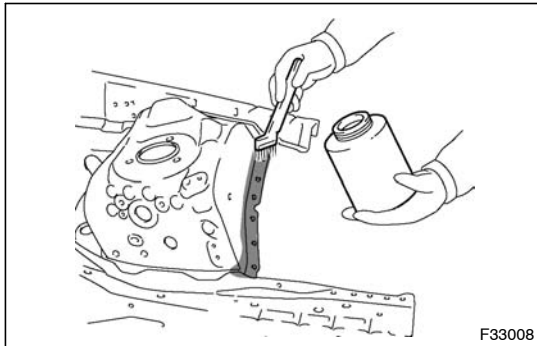


2. PREPARATION FOR INSTALLATION

(a) Spot weld points

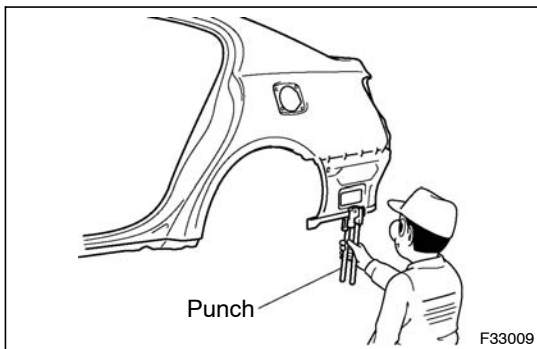
- (1) When welding panels with a combined thickness of over 3 mm, use a MIG (Metal Inert Gas) welder for plug welding.

HINT: Spot welding does not provide sufficient durability for panels with a combined thickness of over 3 mm



(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.



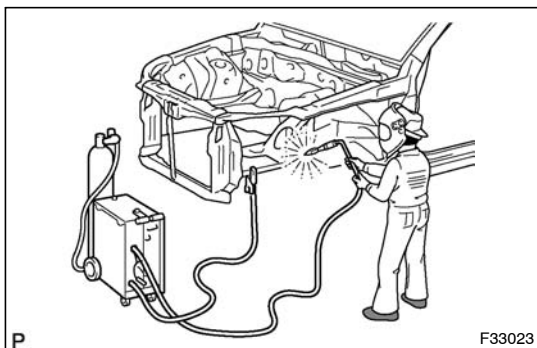
(c) Making holes for plug welding

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

REFERENCE:

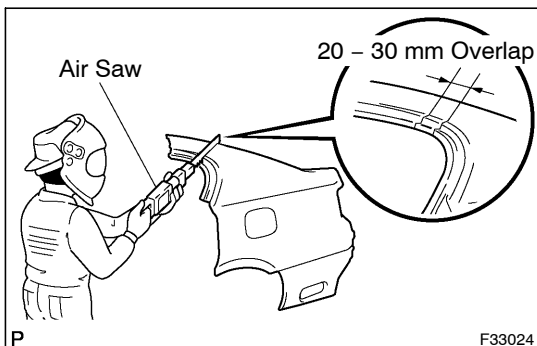
mm

Thickness of welded portion	Size of plug hole
1.0 under	ø 5 over
1.0 – 1.6	ø 6.5 over
1.7 – 2.3	ø 8 over
2.4 over	ø 10 over



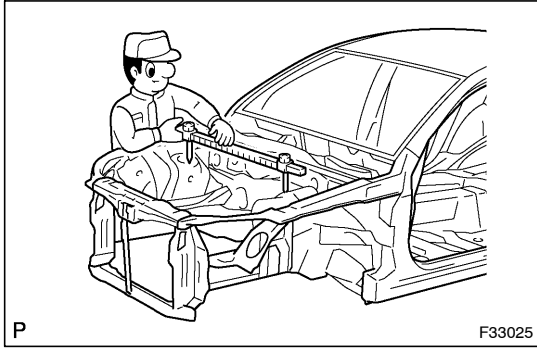
(d) Safety precautions for electrical components

- (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

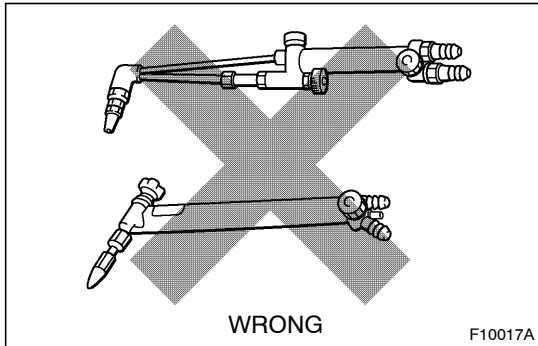
- (1) For joint areas, rough cut the new parts, leaving 20 – 30 mm of overlap.



3. INSTALLATION

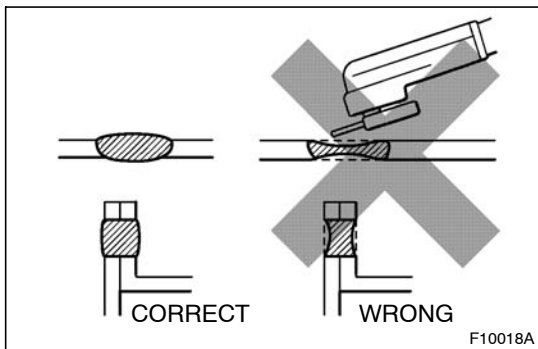
(a) Pre-welding measurements

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



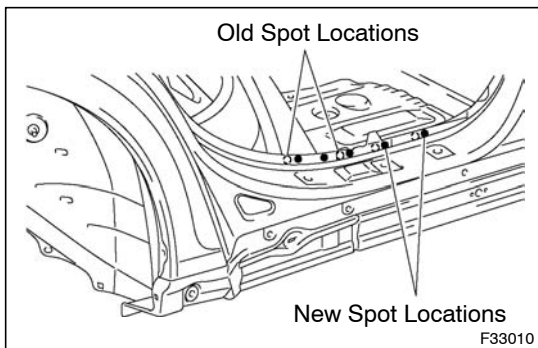
(b) Welding precautions

- (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.



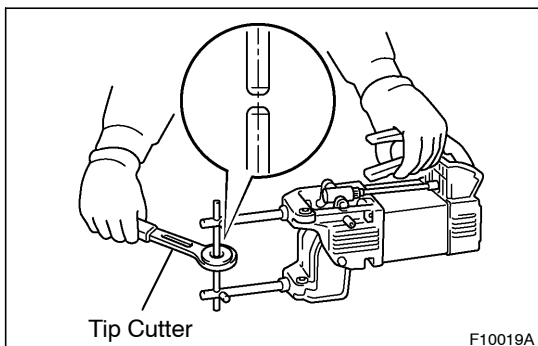
(c) Post-welding refinishing

- (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.



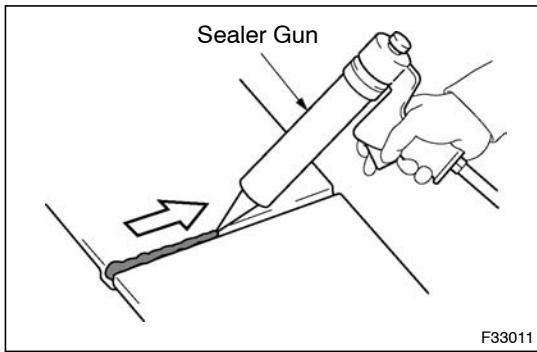
(d) Spot weld locations

- (1) Avoid welding over previously welded areas.



(e) Spot welding precautions

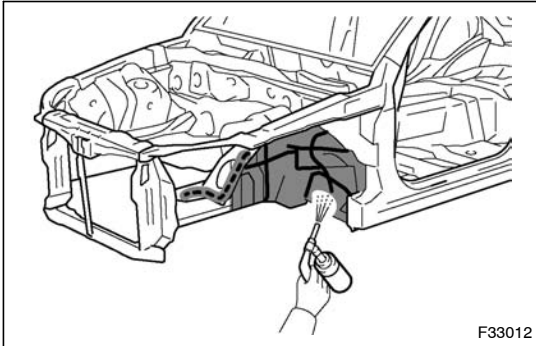
- (1) The shape of the tip point of the spot welder significantly affects the strength of the weld. Therefore, maintain the tip point in the proper shape, and allow it to cool after every five or six spots.
- (2) Completely remove the paint from the areas to be spot welded, including the seams and the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



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

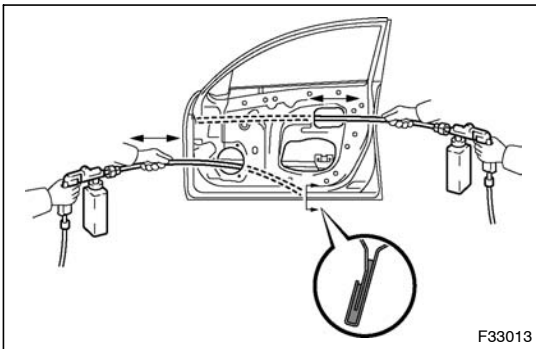
(a) Body sealer application

- (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 under coating 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.

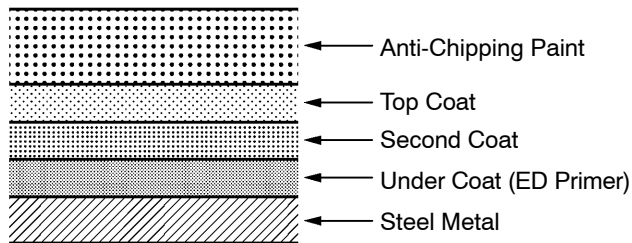
(a) Anti-chipping paint

- (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.

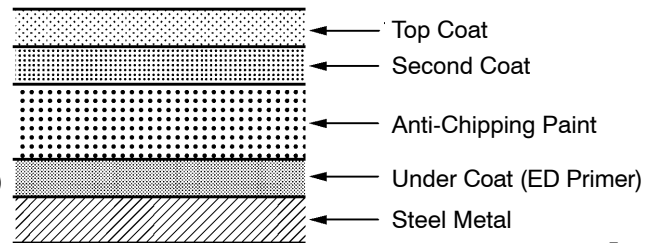
HINT:

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.

- Apply the anti-chipping paint after the top coat.



- Apply the anti-chipping paint before the second coat.



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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 brake control (ABS – VSC) system, bleed the air out of the brake control 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 adjacent 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 memorised 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.

NOTICE: If it is possible for the ambient temperature to reach 80°C or more, remove the ECUs from the vehicle before starting work.

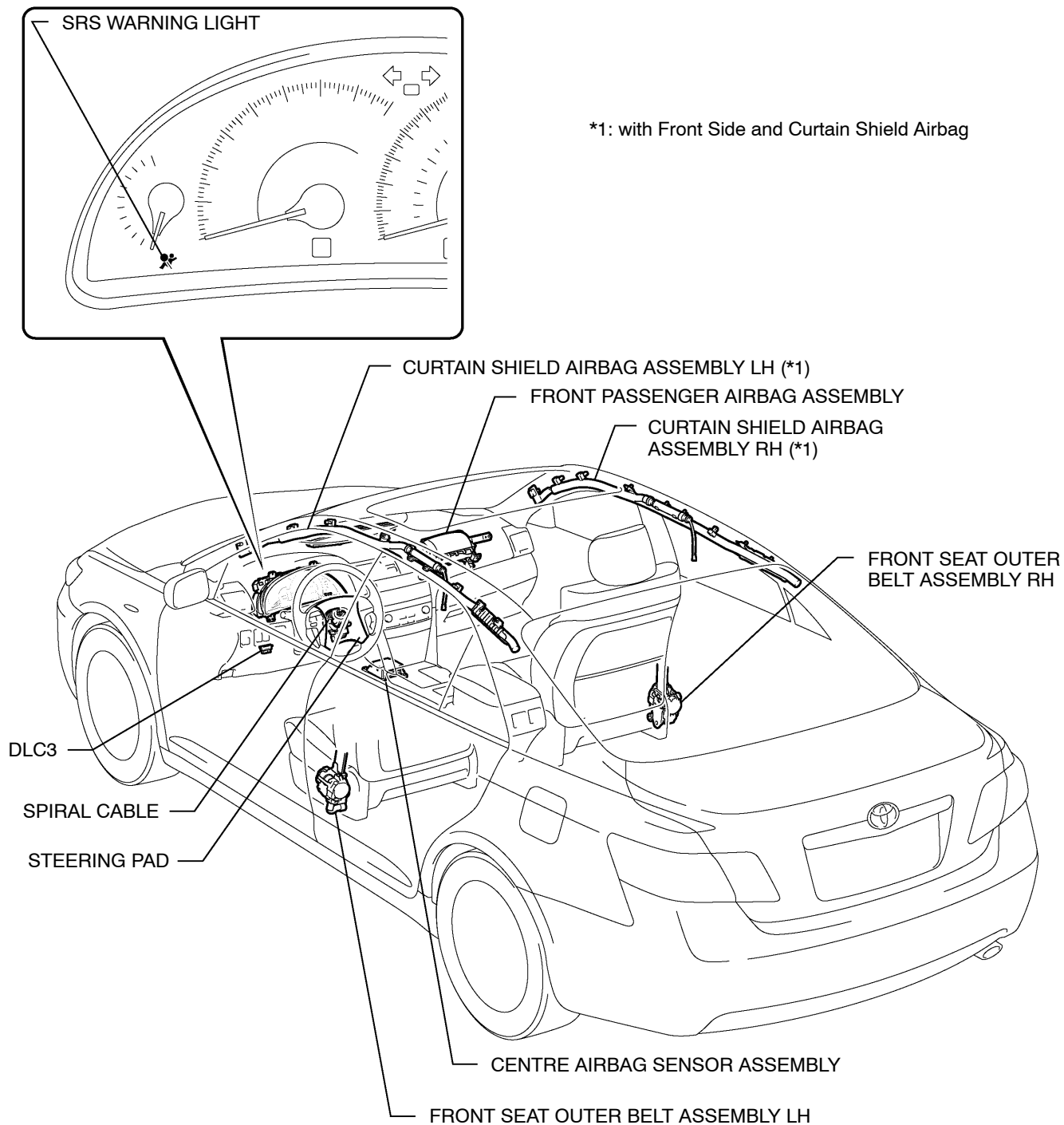
- Be careful not to drop the ECUs and not to apply physical shocks to them.

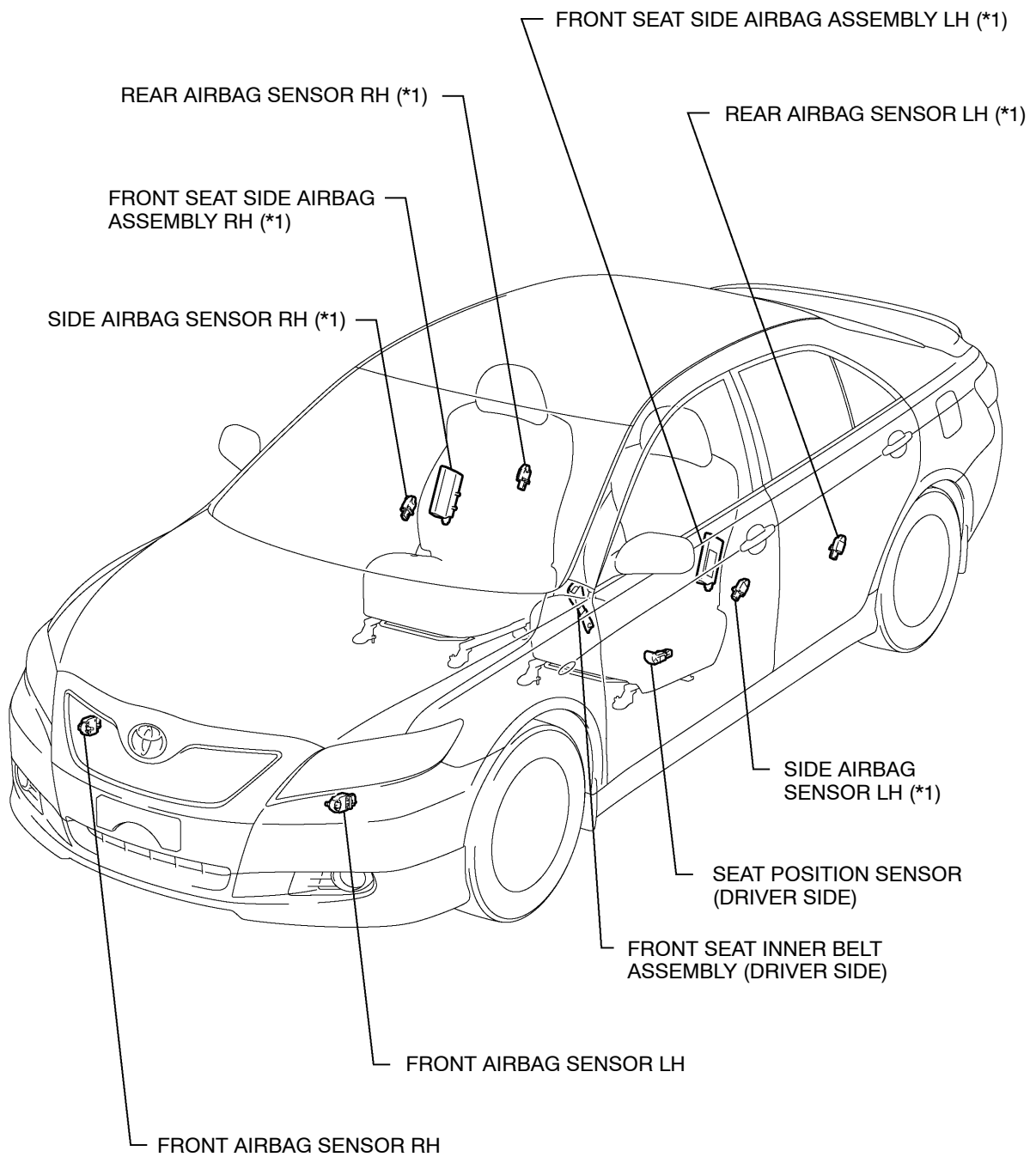
DAMAGED VEHICLE DISPOSAL PRECAUTION (SRS AIRBAG SYSTEM)

For SRS airbag system service and repair procedures, refer to the TOYOTA CAMRY / AURION Repair Manual.

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

COMBINATION METER ASSEMBLY:





*1: with Front Side and Curtain Shield Airbag

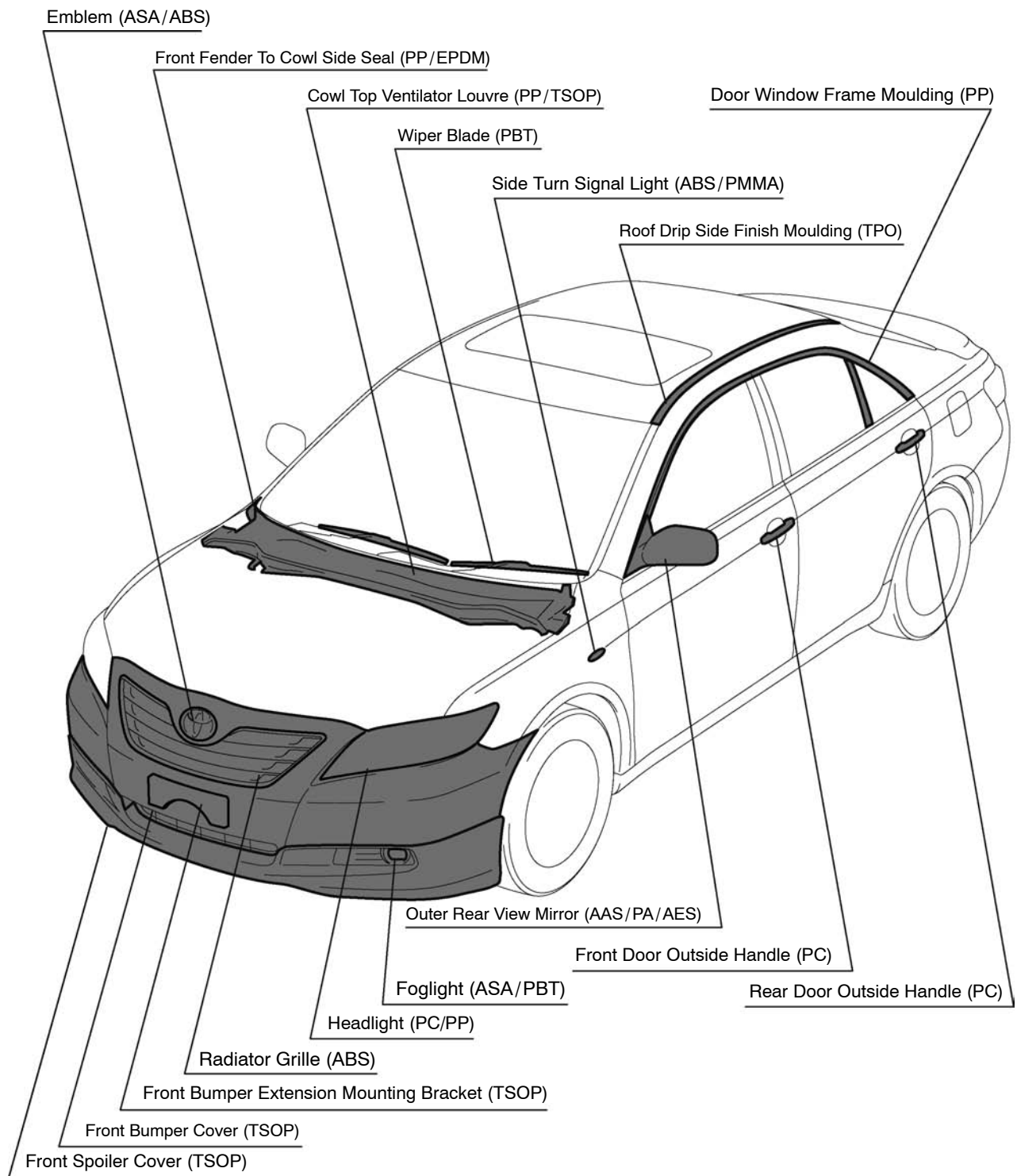
HANDLING PRECAUTIONS OF PLASTIC BODY PARTS

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.
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.
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.
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.

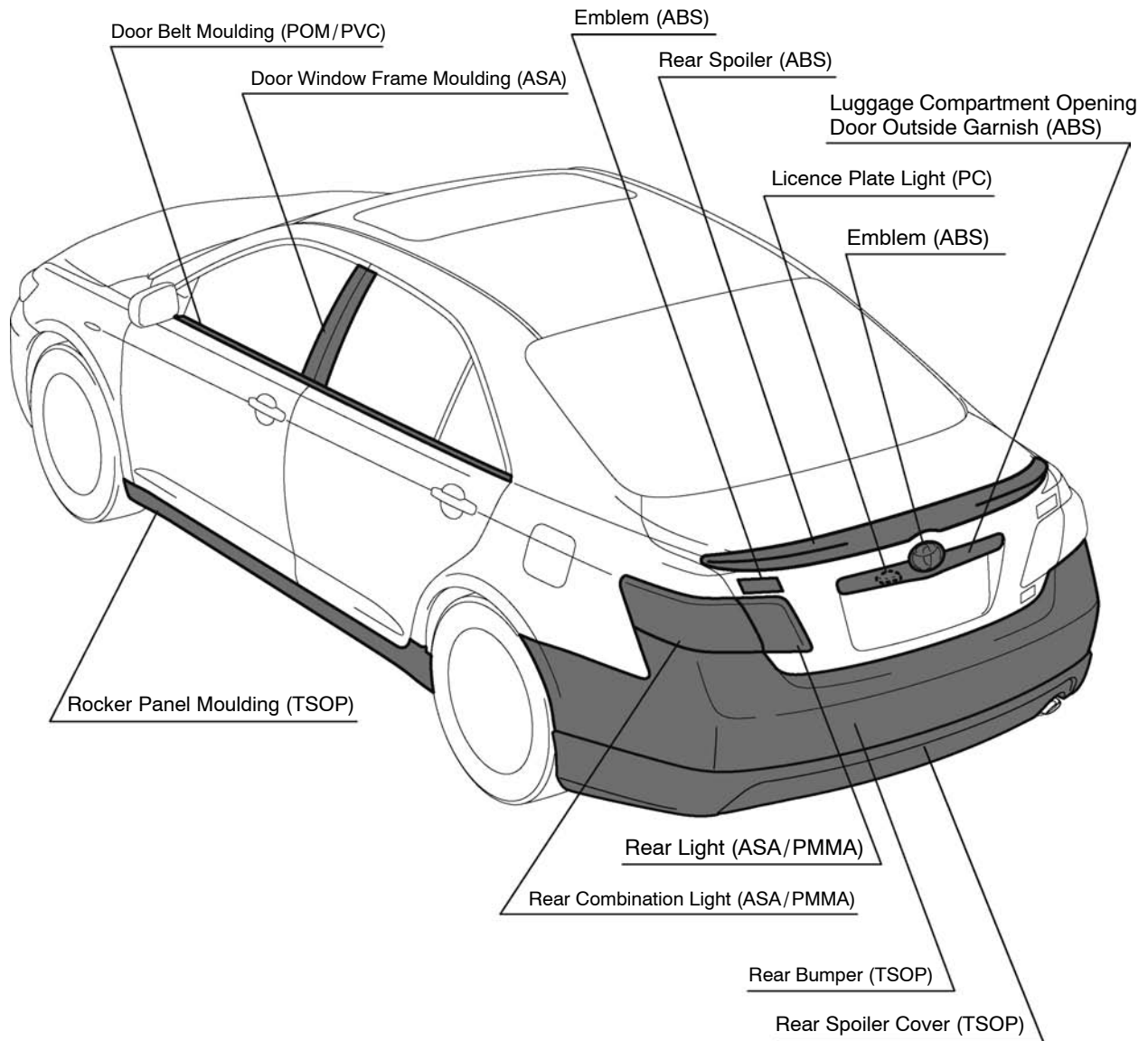
*Temperatures higher than those listed here may result in material deformation during repair.

[for 2AZ-FE]



HINT:

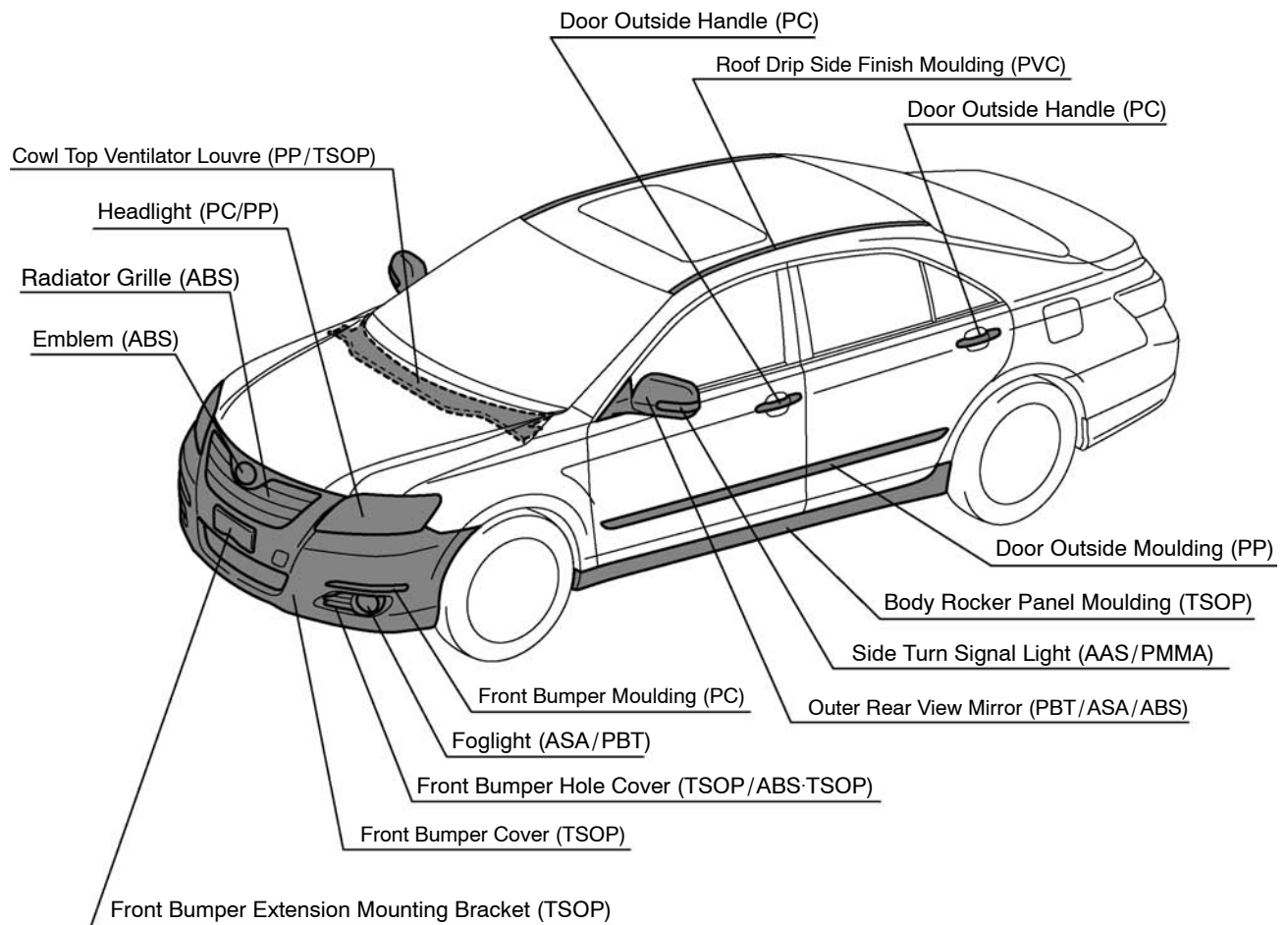
/ Made up of 2 or more kinds of materials.



HINT:

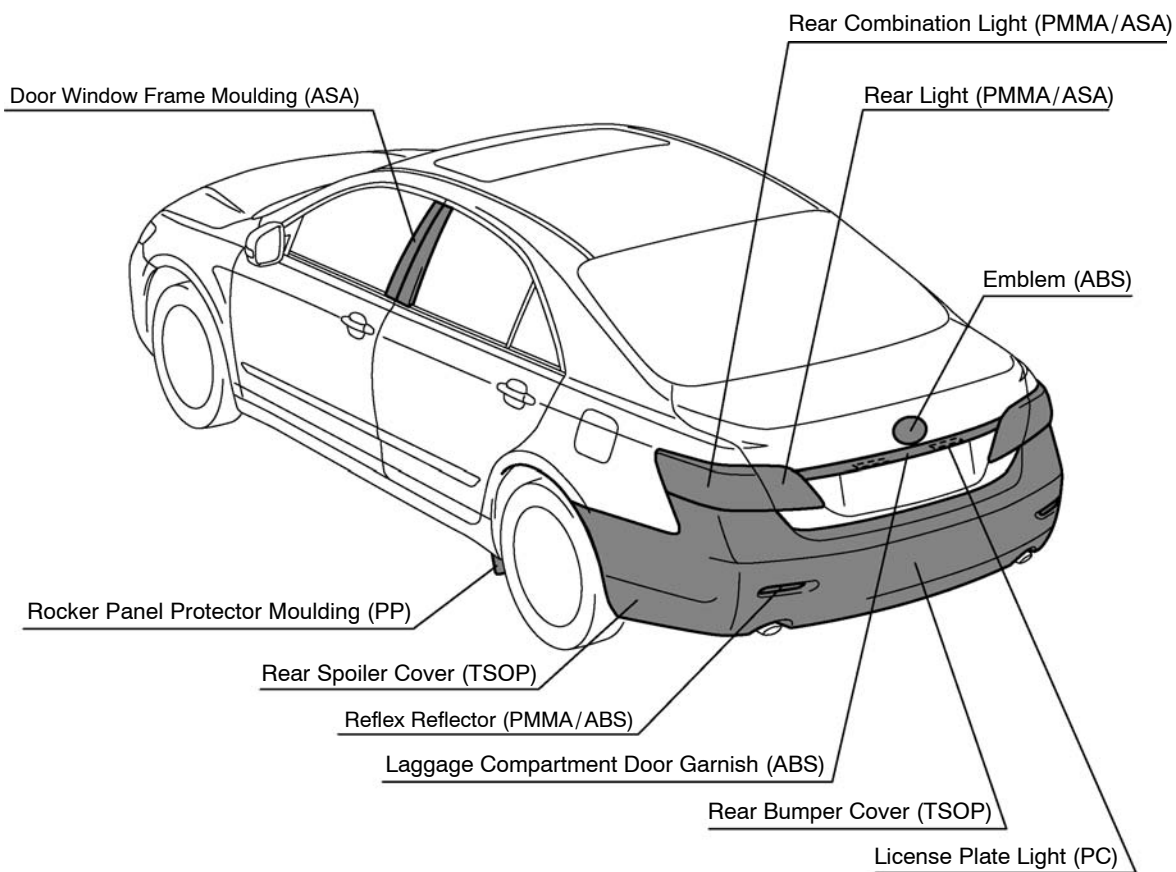
/ Made up of 2 or more kinds of materials.

[for 2GR-FE]



HINT:

- Resin material differs with model.
- / Made up of 2 or more kinds of materials.

**HINT:**

- Resin material differs with model.
- / Made up of 2 or more kinds of materials.