

5. 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, memory of the clock and audio systems will be cancelled. 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 seat and outside rear view mirror, which are all equipped with memory function, it is not possible to make a record of the memory contents. So 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: If it is possible the ambient temperature may reach 80° (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.

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
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

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 LAND CRUISER.

Applicable models: UZJ100, FZJ10_ series
HDJ10_, HZJ105 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 the TOYOTA model is 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 LAND CRUISER 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

GENERAL REPAIR INSTRUCTIONS

Work Precautions

SAFETY

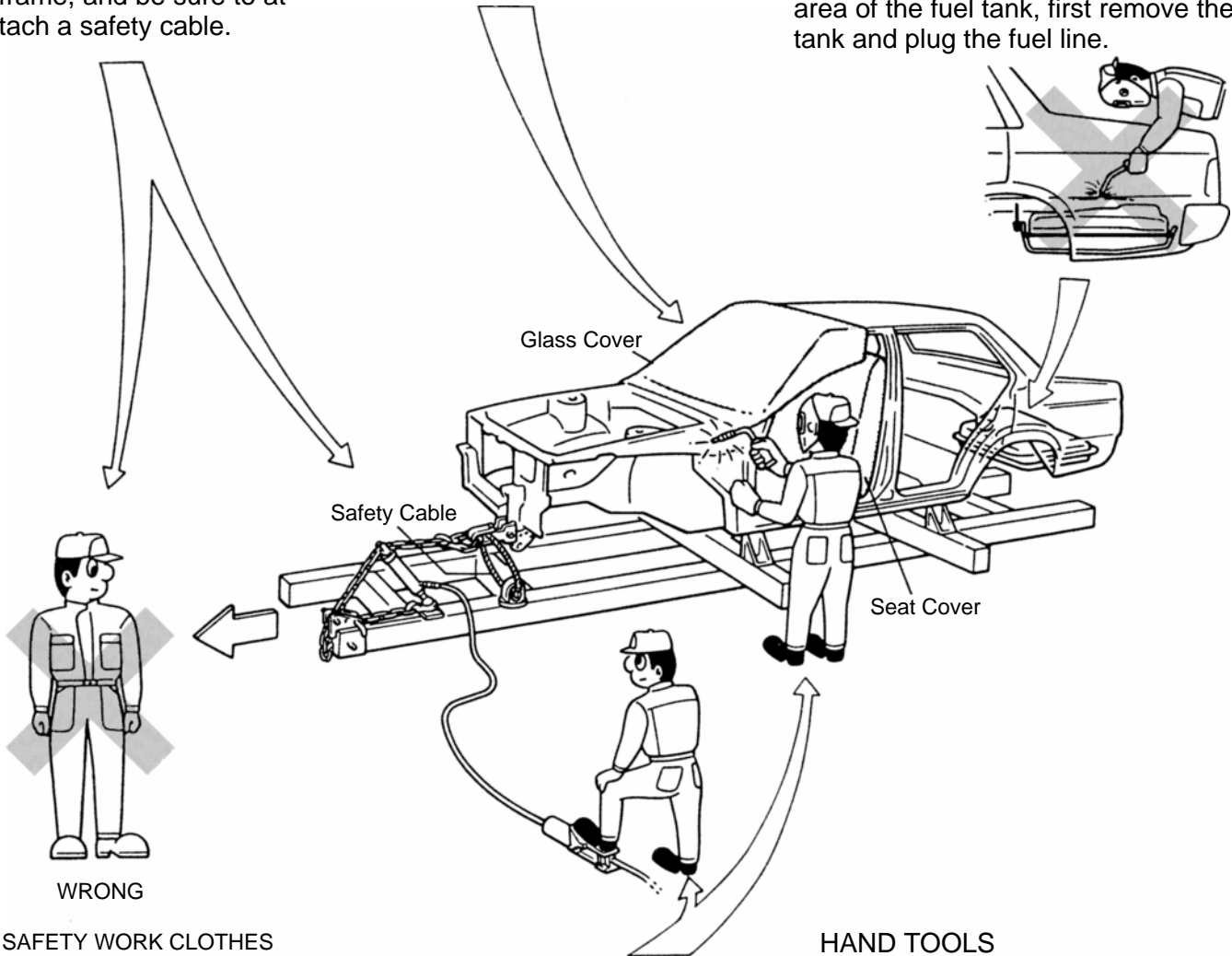
Never stand in direct line with the chain when using a puller on the body or frame, and be sure to attach a safety cable.

VEHICLE PROTECTION

When welding, protect the painted surfaces, windows, seats and carpet with heat-resistant, fire-proof covers.

SAFETY

1. Before performing repair work, check for fuel leaks. If a leak is found, be sure to close the opening totally.
2. If it is necessary to use a frame in the area of the fuel tank, first remove the tank and plug the fuel line.



SAFETY WORK CLOTHES

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.

HAND TOOLS

Keeping your hand tools in neat order improve your work efficiency.

Dust-Prevention Mask



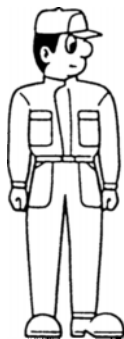
Face Protector



Eye Protector



Safety Shoes



Welder's Glasses



Ear Plugs



Head Protector



Welder's Gloves



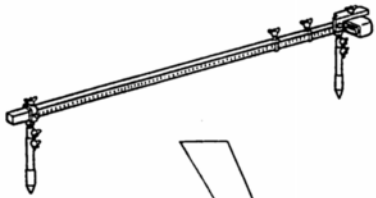
Body Tools Stand

Proper and Efficient Work Procedures

REMOVAL

PRE-REMOVAL MEASURING

Before removal or cutting operations, take measurements in accordance with the dimension diagram. Always use a puller to straighten a damaged body or frame.



NUMBER OF SPOT WELDS AND PANEL POSITIONS

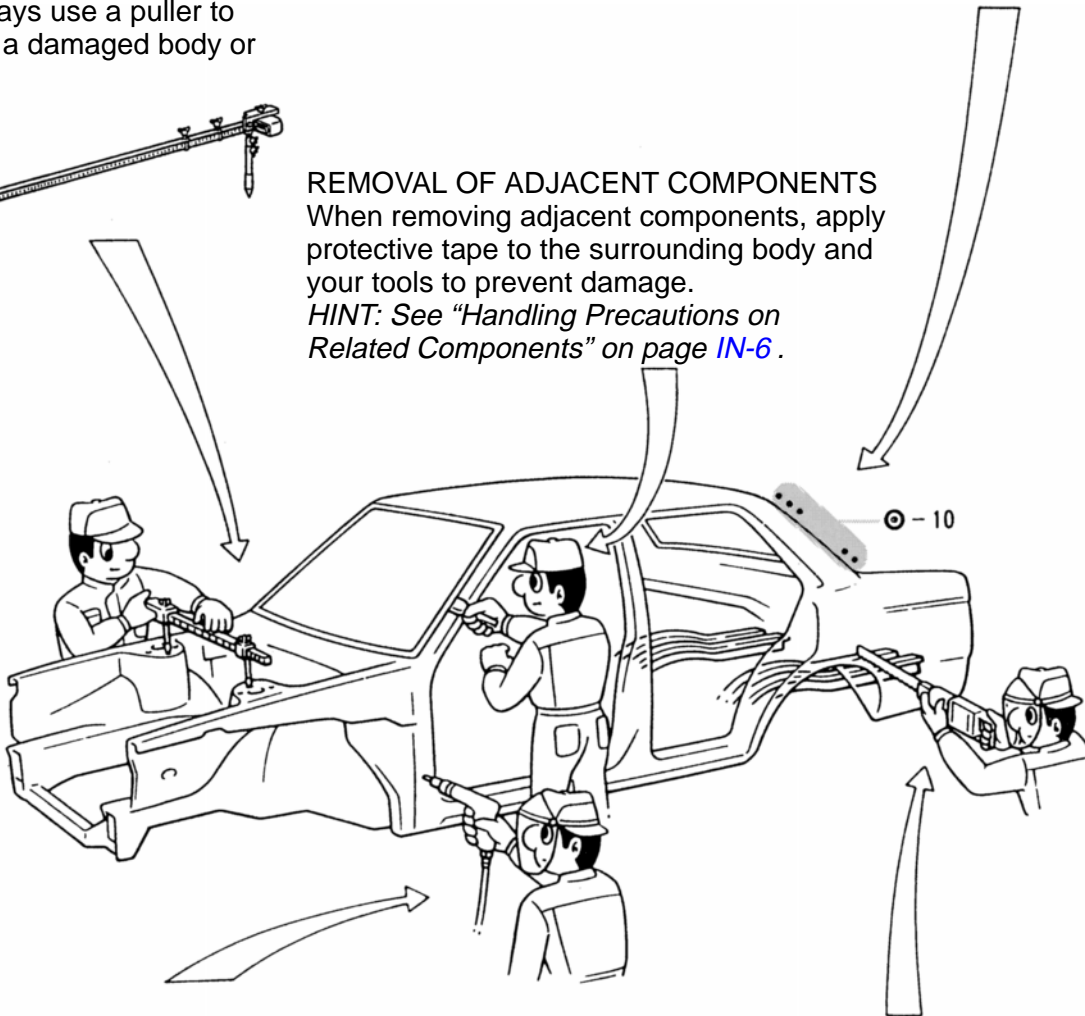
The number of spot welds and the panel positions to be removed are shown for your reference.

HINT: See "Symbols" on page IN-4, 5.

REMOVAL OF ADJACENT COMPONENTS

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

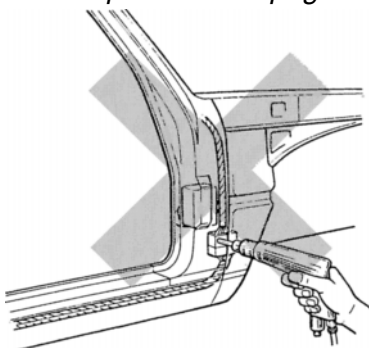
HINT: See "Handling Precautions on Related Components" on page IN-6.



PRECAUTIONS FOR DRILLING OR CUTTING

Check behind any area to be drilled or cut to insure that there are no hoses, wires, etc., that may be damaged.

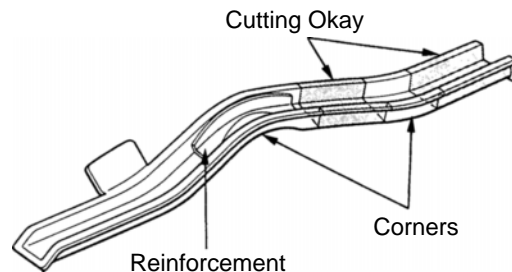
HINT: See "Handling Precautions on Related Components" on page IN-6.



WRONG

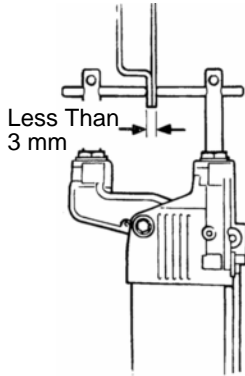
CUTTING AREA

Always cut in a straight line and avoid reinforced area.



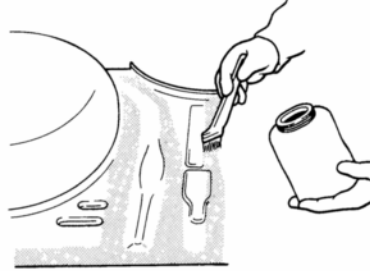
PREPARATION FOR INSTALLATION

SPOT WELD POINTS



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 will not provide sufficient durability for panels over 3 mm (0.12 in.) thick.

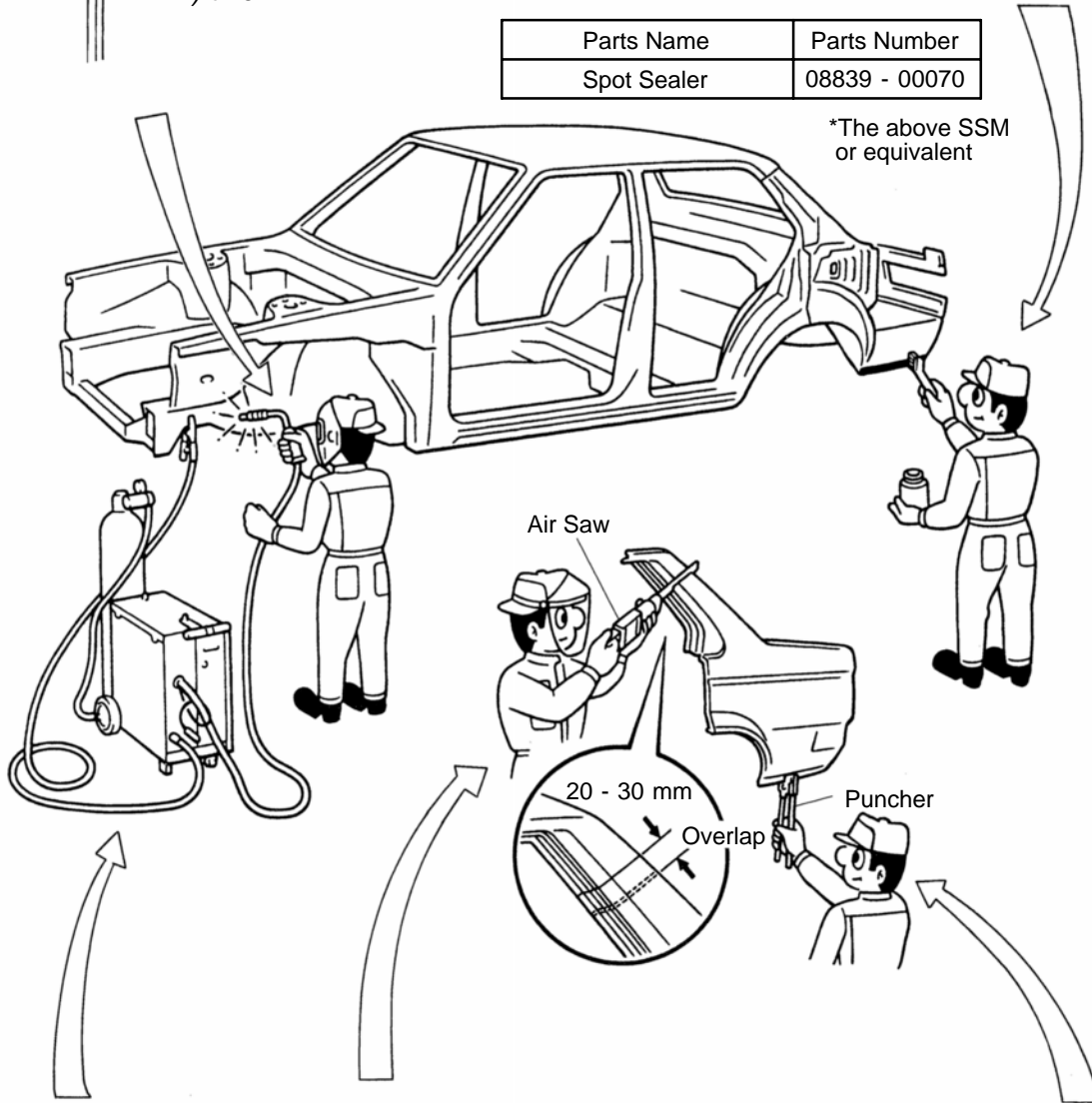
APPLICATION OF WELD-THROUGH PRIMER (SPOT SEALER)



Remove the paint from the portion of the new parts and body to be welded, and apply weld-through primer.
HINT: See "ANTIRUST TREATMENT" on page AR-2.

Parts Name	Parts Number
Spot Sealer	08839 - 00070

*The above SSM or equivalent



SAFETY PRECAUTIONS FOR ELECTRICAL COMPONENTS.
 When welding there is a danger that electrical components will be damaged by the electrical current flowing through the body. Before starting work disconnect the negative terminal of the battery and ground the welder near the welding location of the body.

ROUGH CUTTING OF JOINTS
 For joint areas, rough cut the new parts, leaving 20 - 30 mm (0.79 - 1.18 in.) overlap.

MAKING HOLES FOR PLUG WELDING
 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	5 (0.20) ϕ over
1.0 (0.04) - 1.5 (0.06)	6.5 (0.26) ϕ over
1.5 (0.06) over	8 (0.31) ϕ over

INSTALLATION

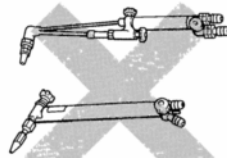
PRE-WELDING MEASUREMENTS

Always take measurements before installing underbody or engine components to insure correct assembly. After installation, confirm proper fit.



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.

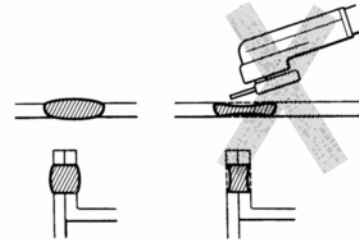


WRONG

2. Plug welding should be done with a MIG (Metal Inert Gas) welder. Do not gas weld or braze panes at areas other than specified.

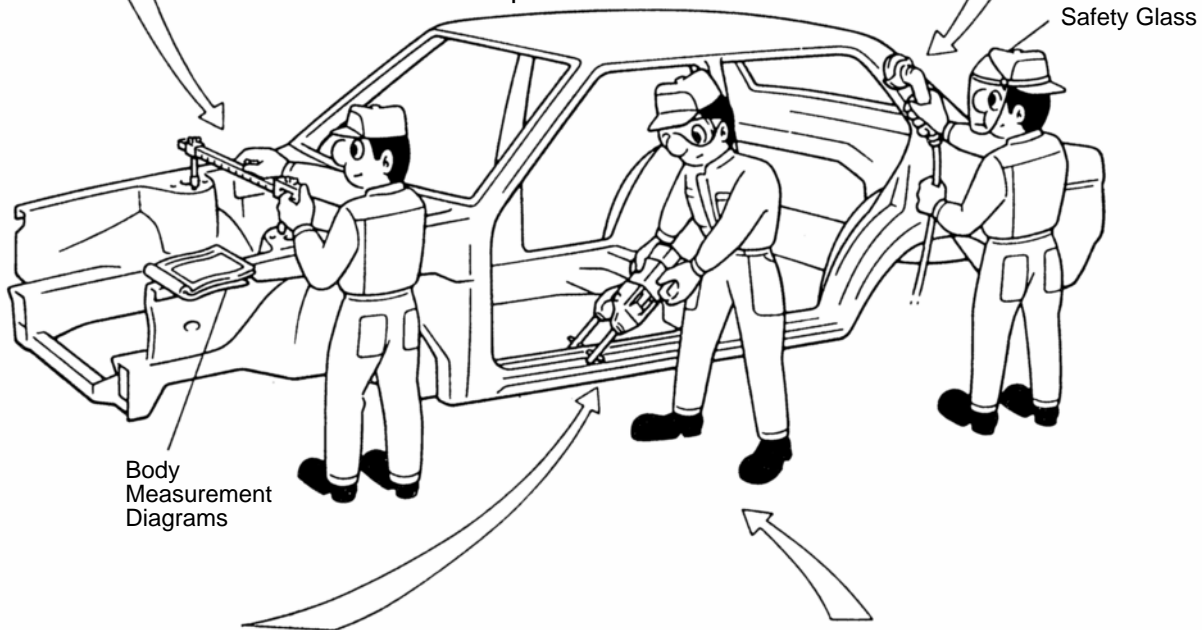
POST WELDING REFINISHING

1. Always check the welded spots to insure they are secure.
2. When smoothing out the weld spots with a disc grinder, be careful not to grind off too much as this would weaken the weld.



OKAY

WRONG

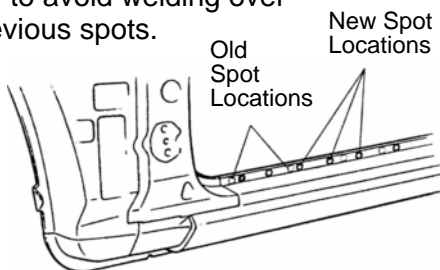


Body Measurement Diagrams

Safety Glass

SPOT WELD LOCATIONS

Try to avoid welding over previous spots.

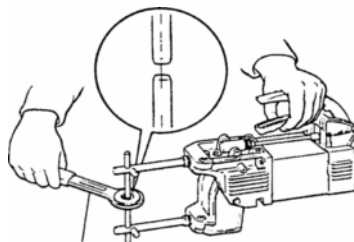


Old Spot Locations

New Spot Locations

SPOT WELDING PRECAUTIONS

1. The shape of the welding tip point has an effect on the strength of the weld.
2. Always insure that the seams and welding tip are free of paint.



Tip Cutter

ANTI-RUST TREATMENT

When replacing body panels, always apply body sealer, anti-rust agent or undercoat according to the requirements of your country.

HINT: For further details, see the description given in Section AR of this manual.

BODY SEALER

Apply body sealer to the required areas.



Cartridge Type Tube Type

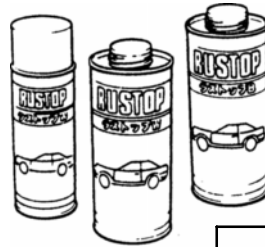
Parts Name	Parts Number
Body Sealer, White (Cartridge Type)	08839-00020
Body Sealer, White (Tube Type)	08839-00030
Body Sealer, Black (Cartridge Type)	08839-00040

*The above SSM or equivalent

ANTI-RUST AGENT (WAX)

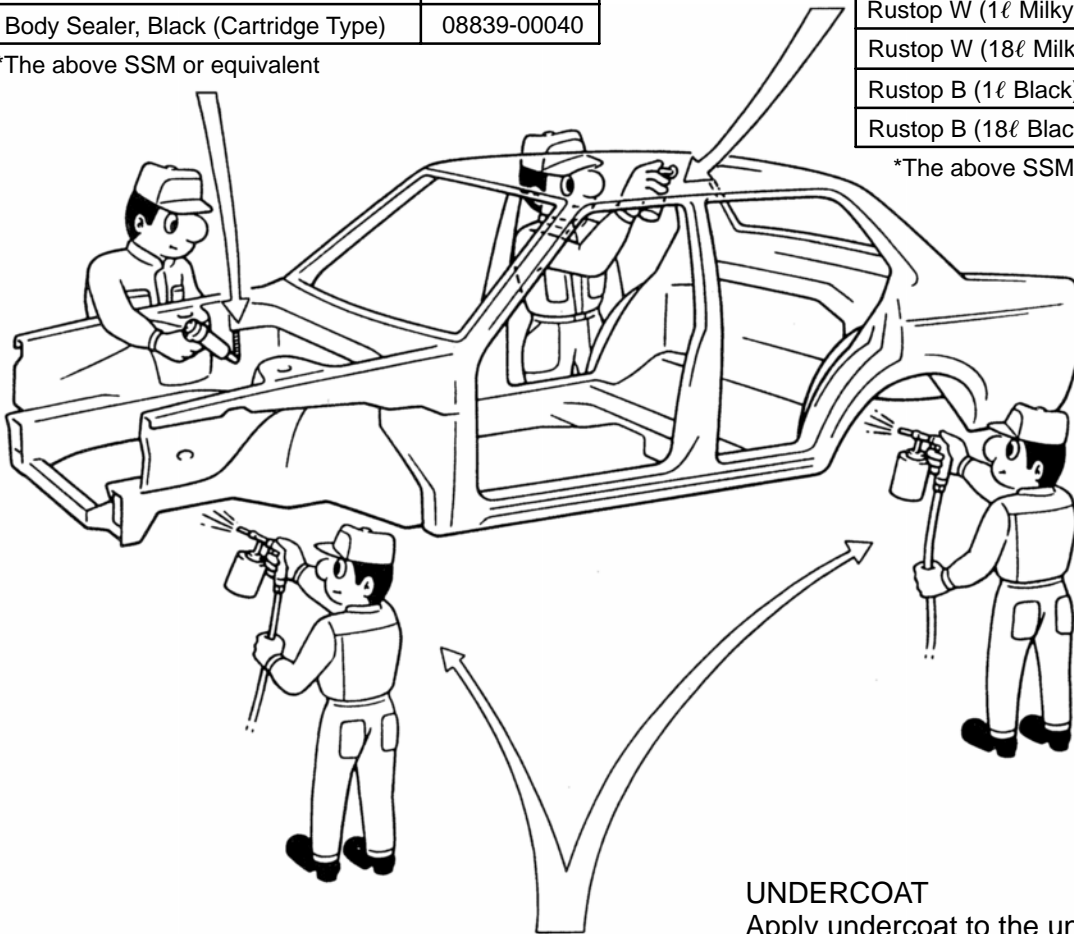
Apply anti-rust agent to following sections.

- Inside of the hems of the doors and hood.
- Around the hinges of the doors and hood.
- Inside of the welded parts with boxed cross-section.



Parts Name	Parts Number
Rustop W (Aerosol)	08860-00200
Rustop W (1l Milky White)	08860-00210
Rustop W (18l Milky White)	08860-00230
Rustop B (1l Black)	08860-00220
Rustop B (18l Black)	08860-00240

*The above SSM or equivalent



UNDERCOAT

Apply undercoat to the underbody and wheel housings.



Undercoating (Oil base)



Undercoating (Water base)



Spray Gun

Parts Name	Parts Number
Pastar UC (Oil Base)	08836-00155
Pastar UW (Water Base)	08836-001 15
Pastar Gun (For thick application)	08836-00091

*The above SSM or equivalent

HANDLING PRECAUTIONS

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 chart.
3. When repairing metal body parts adjoining plastic body parts (by brazing, frame cutting, welding, painting etc.), consideration must given to the property 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.
CAB	Cellulose Acetate	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.
FRP	Fiber Reinforced Plastics	180 (356)	Alcohol and gasoline are harmless.	Avoid alkali.
EVA	Ethylene Acetate	70 (158)	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.
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.

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

Code	Material name	Heat* resistant temperature limit °C (°F)	Resistance to alcohol or gasoline	Notes
PE	Polyethylene	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
PET	Polyethylene Terephthalate	75 (167)	Alcohol and gasoline are harmless.	Avoid dipping in water.
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.
PPO	Modified Polyphenylene Oxide	100 (212)	Alcohol is harmless.	Gasoline is harmless if applied only for quick wiping to remove grease.
PS	Polystyrene	60 (140)	Alcohol and gasoline are harmless if applied only for short time in small amounts.	Avoid dipping or immersing in alcohol, gasoline, solvents, etc.
PUR	Polyurethane	80 (176)	Alcohol is harmless if applied only for very short time in small amounts (e.g., quick wiping to remove grease).	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.
SAN	Styrene Acrylonitrile	80 (176)	Alcohol is 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.
TPU	Thermoplastic Polyurethane	80 (176)	Alcohol is 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.
TSOP	TOYOTA Super Olefine Polymer	80 (176)	Alcohol and gasoline are harmless.	Most solvents are harmless.
UP	Unsaturated Polyester	110 (233)	Alcohol and gasoline are harmless.	Avoid alkali.

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

HANDLING PRECAUTIONS ON RELATED COMPONENTS

1. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

The TOYOTA LAND CRUISER is equipped with an SRS (Supplemental Restraint System), such as the driver airbag and front passenger airbag and seat belt pretensioners. Failure to carry out service operations in the correct sequence could cause the supplemental restraint system to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the supplemental restraint system, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in this manual.

- Malfunction symptoms of the supplemental restraint system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting.
When troubleshooting the supplemental restraint system, always inspect the diagnostic trouble codes before disconnecting the battery.
- Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.
(The supplemental restraint system is equipped with a back-up power source so that if work is started within 90 seconds of disconnecting the negative (-) terminal cable from the battery, the SRS may deploy.)
When the negative (-) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the audio memory system.
Then when work is finished, reset the clock and audio systems as before.
To avoid erasing the memory of each memory system, never use a back-up power supply from outside the vehicle.
- Even in cases of a minor collision where the SRS does not deploy, the passenger's airbag assembly, the steering wheel pad and seat belt pretensioners should be inspected.
Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- Never disassemble and repair the airbag sensor assembly, steering wheel pad in order to reuse it.
- If the airbag sensor assembly, steering wheel pad have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- Do not expose the airbag sensor assembly, steering wheel pad directly to hot air or flames.
- Use a volt/ohmmeter with high impedance (10 k Ω /V minimum) for troubleshooting of the electrical circuit.
- Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- After work on the supplemental restraint system is completed, check the SRS warning light.
- Before repairing the body, remove the SRS parts if, during repair, shocks are likely to be applied to the sensors due to vibrations of the body or direct tapping with tools or other parts.
- Do not expose the SRS parts directly to hot air or flames.

NOTICE:

- 1) *The maximum ambient temperature tolerance is 120°C (248°F) for the front airbag sensor, 105°C (221°F) for the center airbag sensor assembly and 93°C (200°F) for the steering wheel pad, and front passenger airbag assembly. If it is possible that the ambient temperature may reach or exceed the temperature limit, remove the sensors and the steering wheel pad from the vehicle or protect them with a hot insulation material before starting work.*
 - 2) *Prior to welding, remove adjacent SRS parts from the vehicle or protect them with fire-proof covers.*
- If the vehicle is damaged, visually inspect for damage to the steering wheel pad using the inspection procedures described in section RS of the repair manual for the relevant model year.