



Your Toyota Collision & Mechanical Repair Resource

2020 Toyota Corolla Hatchback Using the Right Welding Techniques

A mix of adhesives, spot welding, and additional bracing increases strength while reducing weight

PAGE 3

Special Service Tools (SST)

When SSTs are required and how to order

PAGE 6

Ensuring a Quiet Ride

Using seam sealers, foam fillers, and cavity waxes

PAGE 8



Contributors to this edition of *Collision Pros*: Michael Kramarz, James Meyer, Joe DiDonato, Chris Chartron, Dave Pyle (not pictured)



Safe, Reliable, Long-Lasting Repairs

Toyota's product planning department knows how to keep busy—they're constantly monitoring the market and evaluating industry trends to see what consumers are interested in. This also involves developing new safety and design features. As a result, with each new model, there are updated collision repair specifications that must be followed to ensure safe, reliable, long-lasting repairs. For example, High Strength Steel (HSS) and Ultra High Strength Steel (UHSS) require different repair techniques so knowing where each is located is imperative.

In this issue, we review the 2020 Corolla collision repair manual to help technicians understand where to find the critical repair information they need. We examine specific welding and repair techniques for this model—you'll see what to repair, and more importantly what to replace, after a collision. We then discuss the importance of Special Service Tools (SSTs). Sometimes standard tools just don't do the job, so having the right SSTs on hand will ensure it's possible to properly repair a vehicle. And, we take a look at anti-chipping and two-tone paint and give you a few tips about when, where, and how to handle both of these materials.

If you're curious about how to keep corrosion at bay and restore ride quality after an accident, our overview of seam sealers, foams, anti-corrosion compounds, and sound deadening measures offers some suggestions. While we recommend OE parts for all repairs, we discuss why OE is especially important when it comes to the specialty features of Genuine Toyota windshields. And finally, you'll see why disconnecting a battery may be more complicated than it seems and why a detailed repair plan can help identify everything you need, improving both estimating and work flow. 🛠️



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2020 Toyota Corolla Hatchback

USING THE RIGHT WELDING TECHNIQUES

THE COROLLA HATCHBACK HAS ALWAYS BEEN POPULAR. This being the case, there's a good chance one will show up at your facility in need of repair. Here's some vital information you need to know:

- The Corolla Hatchback is built on the TNGA C platform using a mixture of adhesives, spot welding, and additional bracing to increase overall strength while reducing weight.
- The TNGA structure uses seals in its body panel gaps to insulate against noise penetration and improve air sealing performance.
- Corolla features extensive use of High Strength Steel (HSS) and Ultra High Strength Steel (UHSS), which both require special attention when repairing and welding.
- The structure is assembled using laser screw welding that fuses the steel together without requiring wire filler. A collision repair facility cannot duplicate this style of welding, so be sure to attend the welding course at one of the Toyota training centers to learn the appropriate techniques when you have to make this repair.



LOCATION OF HSS AND UHSS

The Corolla Hatchback Collision Repair Manual will show the exact location of HSS and UHSS. Go to: *Introduction* > *About this vehicle* > *Structural Outline* > *2020 MY Corolla Hatchback*.

Both HSS and UHSS structural properties are diminished when deformed by a collision or from improper sectioning and welding. When that occurs, HSS and UHSS can no longer perform as designed, which could negatively affect occupant safety in a subsequent collision, as well as corrosion resistance.

When working on a Corolla or any Toyota or Lexus, keep the following in mind:

- **Heat repair for HSS and UHSS body and frame components is prohibited:** It can decrease strength and reduce corrosion resistant properties.
- **Intrusion beam repair is prohibited:** If damaged, they will no longer perform as intended, so complete door replacement is required.
- **Bumper reinforcement repair is prohibited:** Once damaged, they will no longer perform as intended, so they require complete replacement.
- **HSS and UHSS occupant cabin reinforcement repair is prohibited:** Again, if damaged and repaired, they will no longer perform as intended, so HSS and UHSS cabin reinforcements require replacement.

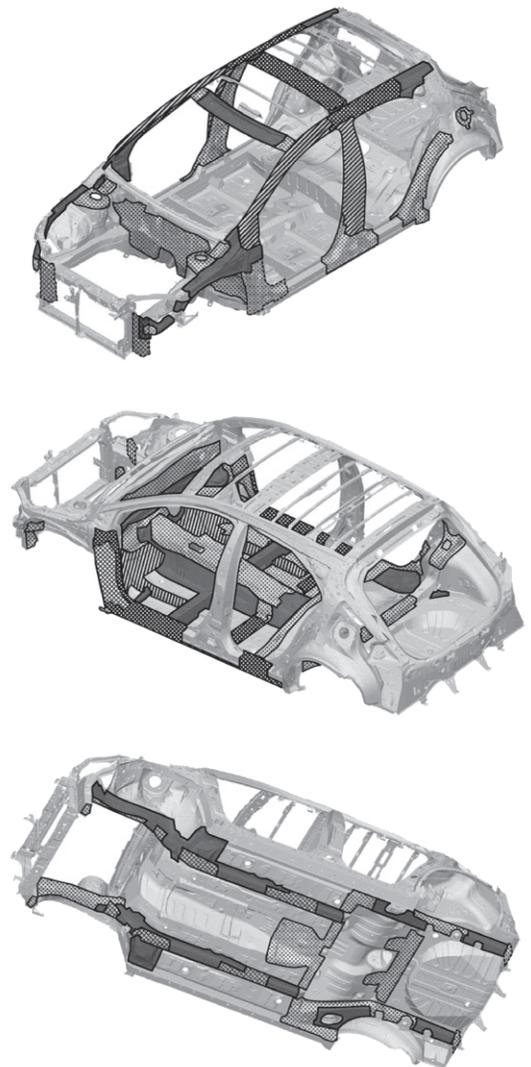
ADDITIONAL PRECAUTIONS

Know when to replace damaged body and frame components: Body and frame deformations that cannot be returned to original shape by pushing, pulling, or hammering (cold straightening) are classified as “kinks”—and kinks require component replacement.

- Deformations that can be returned to original shape by cold straightening methods are classified as “bends.”

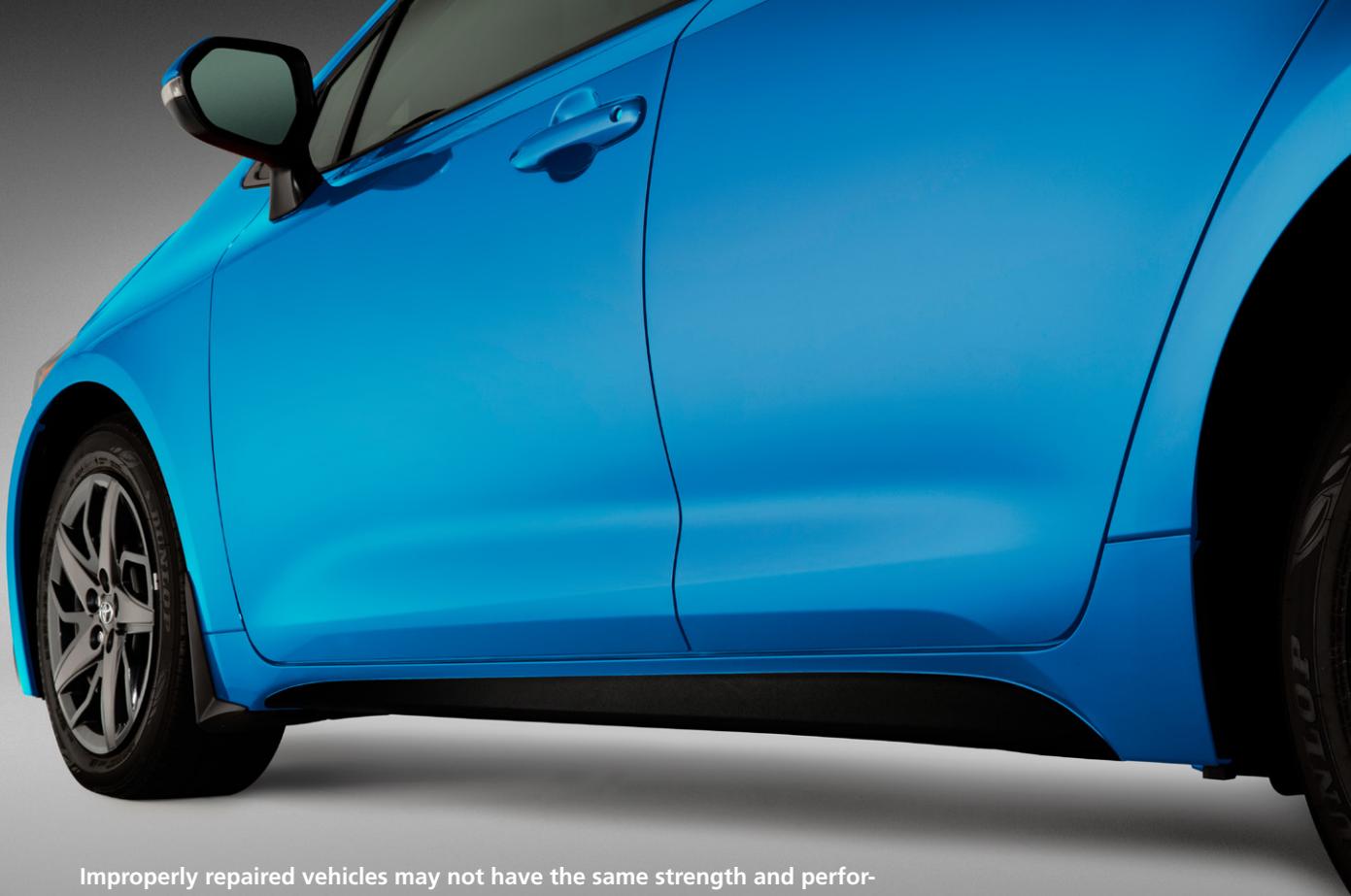
Frame component replacement is limited to New Genuine OE Service Parts Only: Welded components may be installed using Gas Metal Arc Welding/Metal Inert Gas (MIG) techniques using ER70S3 welding wire.

- Ensure proper weld settings and penetration with practice welds.
- Do not weld over factory weld beads.
- Be sure to clean affected repair surfaces and apply epoxy primer and matching topcoat.



	1500 MPa Ultra High Strength Steel
	1180 MPa Ultra High Strength Steel
	980 MPa Ultra High Strength Steel
	590 MPa High Strength Steel
	440 MPa High Strength Steel





Improperly repaired vehicles may not have the same strength and performance rating of new vehicles. Therefore, damaged occupant cabin reinforcements must be replaced.

Because occupant safety is the highest priority, do not use the following occupant cabin reinforcement repair procedures:

- Hot and cold straightening methods
- Sectioning of 980 MPa and 590 MPa strength-rated pillar reinforcements
- Sectioning of 440 MPa rated components at locations other than those specified

Toyota conducts crash tests on the original vehicles, as well as on vehicles that have been repaired to see how they compare. Improperly repaired vehicles may not have the same strength and performance rating of new vehicles. Therefore, damaged occupant cabin reinforcements must be replaced.

Please attend instructor-led hands-on training courses for in-depth HSS and UHSS collision repair techniques and refer to the appropriate Collision Repair Information Bulletins on TIS for detailed information and precautions. It's not just about making the vehicle look like new—it also has to perform like new in the case of another collision. 📄



TOYOTA & LEXUS APPROVED REPAIR METHODS

- Cold Straightening: Pushing-Pulling Hammering
- Weld-On Pulling Aids
- Sectioning at Specified Locations
- Open Butt Joint
- Installing Genuine OEM Parts
- Adhesive & Weld Bonding at Specified Locations

METHODS NOT APPROVED

- Stress Relief: Heating HSS and UHSS
- Stress Relief: Holes or Access Windows
- Sectioning at Non-Specified Locations
- Butt Joint with Backing (Sleeve)
- Installing Aftermarket and Recycled Parts
- Substituting Adhesive for Weld

Special Service Tool (SST)

WHEN REQUIRED AND HOW TO ORDER



AN SST, OR SPECIAL SERVICE TOOL, IS DESIGNED TO PERFORM A VERY SPECIFIC TASK. Used to fix a component that isn't easily repaired by a standard tool, SSTs are typically developed by engineers during the vehicle design phase to ensure the vehicle can be properly repaired when necessary.

For example, an SST is required to install the seal on direct injectors for the latest Toyota Camry. There isn't a standard tool that will allow a technician to replace the seal on this type of injector, so an SST is required to complete the repair. Similarly, as components are designed, engineers may develop new SSTs for specific tasks or repairs to ensure serviceability.

While these tools are available via aftermarket providers, only Toyota or Lexus SSTs are built to meet factory standards and ensure consistent repairs.

HOW DO YOU ORDER AN SST?

It's easy for technicians to find and order the Toyota and Lexus parts they need. SSTs can be ordered by calling 1-800-933-8335 or by visiting the appropriate SST site via TIS <https://techinfo.toyota.com> or:

- For Toyota go to:
<https://toyota.service-solutions.com/en-US/Pages/Home.aspx>
- For Lexus go to:
<https://lexus.service-solutions.com/en-US/Pages/Home.aspx>

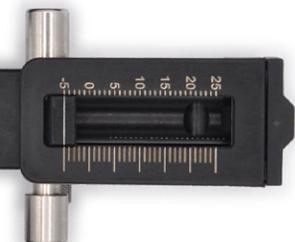
DO YOU NEED TO BE A DEALER OR AFFILIATED WITH A DEALER TO ORDER AN SST?

No. Because of "Right to Repair" all SSTs are available to both dealers and independent repair shops.

DON'T HAVE THE RIGHT SST?

"If you're a collision shop, there may not be that many SSTs associated with body repair. However, there are many required for general service and mechanical repairs" says Robby Mellor, Product Engineer, Toyota Motor North America. "If your shop has a relationship with a Toyota dealership, it may be more cost effective to have the dealership technician perform repairs that require any SSTs."

For tools that are designed to meet Toyota and Lexus factory specifications, and to achieve accurate repairs, Toyota and Lexus always recommend sourcing SSTs through the recommended channel. 📍



TIS DETAILED TUTORIAL SERIES, PART III—PAINT

Using the Right Paint in the Right Places



HOW, WHEN, AND WHERE TO USE ANTI-CHIPPING PAINT, TWO-TONE PAINT

To make a quality repair on a Toyota or Lexus, you'll want to educate yourself first on specific information and precautions required for the vehicle at hand—including how to apply anti-chipping paint or how to handle two-tone paint. You'll find these details in your Toyota and Lexus specific Collision Repair Manual under the "Work Notices and Precautions" section.

ANTI-CHIPPING PAINT:

- The Collision Repair Manual will show the precise location that requires anti-chipping paint.
- Anti-chipping paint protects the body from damage due to dirt, gravel, and debris.
 - Anti-chipping paint may be required in a variety of locations, including the hood, roof panel, front body pillar, rocker panels, wheel arches, and the doors.
 - Certain areas may also require Soft-Chipping Primer.
 - Certain areas may require Protection Tape.
- Anti-chipping paint is applied where needed, before applying the top coat.
- If anti-chipping paint is unnecessarily applied to an area, apply degreasing agent to a clean cloth and clean the paint off immediately.

TWO-TONE PAINT:

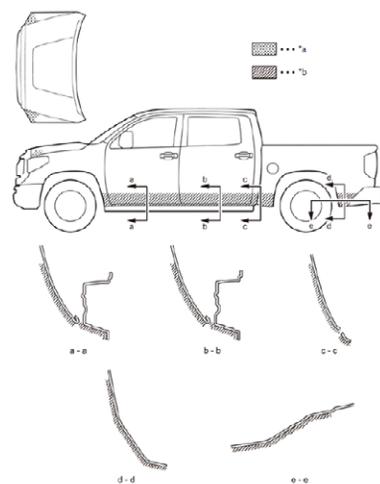
- When a vehicle has a two-tone paint scheme, look for information in the "Work Notice and Precaution" section of your Collision Repair Manual. There, you'll find information on specific locations, detailed dimensions on how to measure and mask, appropriate borders, plus any other specific instructions to ensure that the repair matches the factory two-tone paint.

A Work Notice and Precaution may also be published when a model uses a unique color or has unique painting instructions. Case in point: 2017-2020 MY 86 models are available in NBB (Solar Orange). New vehicle painting for that paint color is performed with the hood closed. So, when one of these vehicles comes in for repairs, there are special procedures you have to follow to ensure you return the vehicle looking like new.

The key is to research first, paint second. When you take the time to review the Work Notices and Precautions prior to the repair, that makes it easier to ensure each job is fixed right the first time. 🛠️

ANTI-CHIP AND TWO-TONE PAINT

To ensure proper application, before applying anti-chip or two-tone paint to a vehicle, refer to the vehicle application specs found on TIS techinfo.toyota.com.



Anti-chip Paint



Two-tone Paint

ENSURING A QUIET RIDE



USING SEAM SEALERS AND FOAMS

Toyota and Lexus vehicles are known for their ride quality, from the quiet interior to the lack of squeaks and rattles. So, when a Toyota or Lexus is in an accident, it's vitally important for collision repair facilities to fix it so it performs like new mile after mile, year after year.

The challenge of restoring the vehicle to its original condition includes ensuring a quiet ride. Consider all of the areas potentially affected in a collision: from bumpers, fenders, and doors, to the hood and more. Once an area is damaged, if it's not properly repaired, it can become a "noise generator" or create a potential corrosion "hot spot." That's why it's important to take precautions and follow all of the proper procedures, which can include using seam sealers, adhesives, foam fillers, and cavity waxes, to make sure the vehicle is quiet and protected from corrosion.

ANTI-CORROSION COMPOUNDS AND MATERIALS

Below are the various compounds used to reduce noise, vibration, and corrosion:

- **Seam Sealer:** First and foremost, it seals visible seams. It's also strategically placed on the inside of body panels to help prevent corrosion, deaden sound, and provide panel support.
- **Polyvinyl Chloride (PVC) Undercoating:** Offers excellent chip resistance, sealing, and sound deadening qualities.
- **Chip Resistant Coatings:** Includes primers, PVC, and urethane coatings that provide chip resistance in areas that receive the most exposure to road debris.
- **Cavity Wax:** A paraffin-based compound that's applied to interior panel surfaces in areas prone to moisture exposure. It can also be applied to hinge-to-panel and body surface areas to limit effects from dirt intrusion.



SOUND-DEADENING MEASURES

Foams and silencer sheets significantly contribute to the quiet ride of Toyota and Lexus vehicles. When performing body repairs, these materials need to be replaced or repaired to maintain that quiet ride.

- Silencer Sheets: Also known as beta pads, silencer sheets are found on the inner surface of door panels, quarter panels, and on interior floor surfaces. Silencer sheets absorb road noise, reduce vibration, and enhance panel rigidity. When replacing silencer sheets, be sure to match the thickness and composition to the specifications of the vehicle you are repairing.
- Foams: Sound can easily transfer through vehicle inner structures, and foams work to deaden those sounds. Foams are also used to enhance strength characteristics in key areas. If these materials become involved in the repair and are not re-usable, replace them with materials that are as closely matched as possible to the OE material.



HIGH STRENGTH STEEL, PAINT, AND CORROSION PREVENTION

Another factor to consider when repairing a Toyota or Lexus vehicle is understanding the effects of heat on metal. Too much heat and the tensile strength decreases, elongation can occur, and the metal can become soft and melt. Therefore, it's critical that welding be performed within the recommended heat range.

Next, you'll need to determine if you're working on corrosion resistant sheet metal or ordinary sheet metal, and then follow the recommended procedures based on the material you are repairing.

If the part you're working on is made of High-Strength Steel (HSS), research what type of HSS you're working with—Rephosphorized Steel, Si-Mn Solid Solution Hardened Steel, Precipitation Hardened Steel, or Dual Phase Steel—as each has its own unique properties and welding requirements.

You also need to know how the vehicle was originally painted. Toyota and Lexus are known for producing superior, long lasting finishes. This is done either by dipping or electro-deposition (ED), and starts with an anti-corrosive layer of zinc-phosphate applied to the bare metal of the car.

Finally, to make sure you maintain the anti-corrosion properties, follow the established corrosion prevention processes during collision repairs by applying the appropriate preventative compounds—i.e. anti-chipping coatings, seam sealer, anti-rust agents, etc.

For the best results, your goal should be to always follow the appropriate Toyota and Lexus repair procedures for all repairs. Using the proper corrosion protections and sound-deadening measures will ensure a complete, safe, quiet, and quality repair.

To find the proper products and procedures in the appropriate Corrosion Repair Manual, go to: *General > Work Notices and Precautions > Anti-Rust Treatment After Installation of Body Structure Parts or Outer Panels*. You should also refer to: *Vehicle Exterior > Painting / Coating*. 📖

THE ADVANTAGE OF TOYOTA GENUINE WINDSHIELDS

WINDSHIELDS ARE MORE THAN A MEANS TO SEE THE ROAD AHEAD. They actually contribute to the structural integrity of a vehicle, particularly with relation to the strength of the roof and the front body pillars—both critical in a rollover situation. That being the case, windshields need to be considered safety-related components that must be repaired with care.

THE TOYOTA GENUINE DIFFERENCE

Both Toyota (TSS) and Lexus (LSS) Safety Sense System features, also referred to as Advanced Driver Assistance Systems (ADAS), are designed to operate through a Genuine Toyota Windshield. These systems include Pre-Collision with Pedestrian Detection (PCS w/PD), Lane Departure Alert with Steering Assist (LDA w/SA), and Auto High Beams (AHB). While non-OEM parts may look the same and fit in the same physical space on the vehicle, they may cause Safety Sense Systems to operate incorrectly or not at all.

“The only way to be sure that the vehicle safety systems will operate as the Original Equipment (OE) is intended and designed for is to install a Genuine Toyota Windshield,” says Joe DiDonato, Training Instructor for Toyota Collision Refinish and Repair.

INTEGRATED SAFETY SENSE TECHNOLOGIES

- **FORWARD RECOGNITION CAMERA:** Detects objects in front of the vehicle and provides input to the Pre-Collision, Dynamic Radar Cruise Control, Automatic High Beam, and Lane Departure Alert systems. A glass heating element and mounting bracket built specifically into Toyota Genuine OE Windshields helps to provide the camera with clear “vision” to the area ahead of the vehicle required for proper system operation.

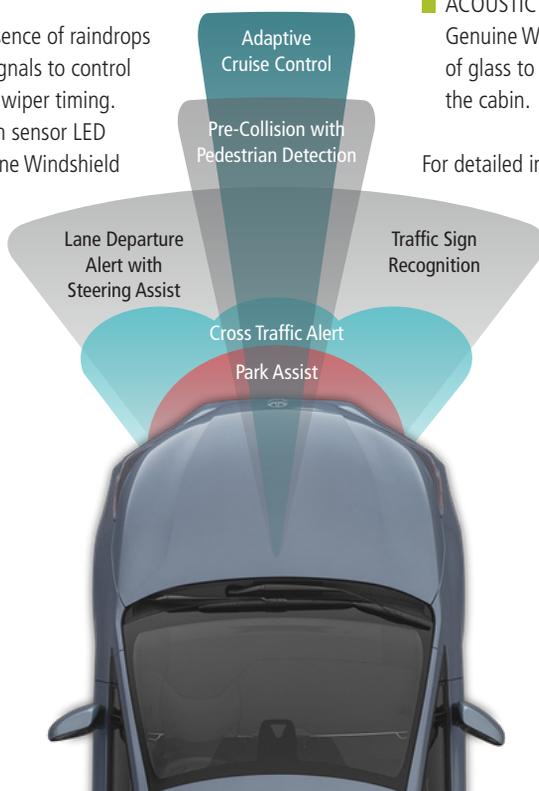
ness between the layers of glass designed to clearly display vehicle information without a double image.

- **WINDSHIELD DEICER HEATING ELEMENT:** Heats up the windshield to help remove frost and ice where the front wipers rest. A heating element is integrated into the glass of a Toyota Genuine Windshield and the amount of element resistance is designed to operate properly with the electrical system of your customer’s Toyota.
- **UV PROTECTION:** Integrated into Toyota Genuine Windshields and is designed to protect against harmful UV rays, up to 100% in some models.

OTHER FEATURES THAT RELY ON OE WINDSHIELDS TO ENSURE PROPER OPERATION ARE:

- **RAIN SENSOR:** Detects the presence of raindrops on the windshield and sends signals to control the wiper speed at the optimal wiper timing. Infrared rays emitted by the rain sensor LED are reflected by a Toyota Genuine Windshield at varying rates depending on the absence or presence of rain.
- **HEADS UP DISPLAY PROJECTOR:** Projects vehicle information, such as miles per hour and fuel consumption, onto the windshield for a safe and convenient view while driving. Toyota Genuine Windshields have a wedge-shaped inner film with varying degrees of thick-

- **ACOUSTIC LAMINATION:** Integrated into Toyota Genuine Windshields between the different layers of glass to help reduce ambient noise inside the cabin.



For detailed information on how these systems work, refer to vehicle-specific New Model Features Manuals. For vehicle-specific windshield removal and installation procedures, refer to the Repair Manual instructions and ‘Glass Replacement’ Collision Repair Information Bulletin (CRIB) #127 found on the Toyota Technical Information System (TIS) website: techinfo.toyota.com or t3.tms.toyota.com. 📄

Image for illustration purposes only. Range not to scale, options may change by model.

DISCONNECTING & RECONNECTING A TOYOTA BATTERY

AWARENESS, PLANNING, AND COMMUNICATION REQUIRED

Disconnecting or reconnecting a 12V battery has more weight than many technicians, estimators, and customers may realize. Both processes require awareness, planning, and communication. When a damaged vehicle comes into a collision repair facility, it may be necessary to disconnect the vehicle's battery to safely repair the vehicle. However, this common step can add complexity by triggering the need for additional repair procedures. The good news? Toyota tells you exactly what electrical and safety system initializations or calibrations are necessary after reconnecting the battery.

WHY DISCONNECT THE BATTERY?

When a vehicle battery is connected, there's a potential pathway to all of its electrical circuits and components. If a battery is not disconnected during a repair, the electrical energy from a weld being performed can damage electrical components like ECUs (Electrical Control Units), negatively impacting any number of sensitive electronic systems and SRS components.

WHEN TO DISCONNECT A BATTERY

There are a few reasons a battery might need to be disconnected, but the most significant reason in terms of collision repair is to protect electrical systems while welding. "A 12V battery should be disconnected, essentially taking off-line all circuits and connected components to protect them when welding on the vehicle," cautions James Meyer, Training Instructor for Toyota Collision Refinish and Repair. "In addition," Meyer says, "the main SRS ECU wire harness should be disconnected and any ECUs within 18" of weld locations removed. These extra steps prevent the potential for accidental airbag discharge and damage to ECUs from induced welding current."

FOLLOW TOYOTA'S RECOMMENDED REPAIR PROCEDURES

The first step in following recommended procedures is to research the model-specific information for the vehicle on which you're working. This information can be found on Toyota's Technical Information System website (TIS) <https://one.tis.toyota.com>. TIS provides access to key precautions and service procedures necessary to repair Toyota and Lexus vehicles. These resources include: Collision Repair Manuals and Collision Repair Bulletins; Electrical Wiring Diagrams and Repair Manuals; and Technical Service Bulletins. TIS also features a VIN search tool that will enable you to identify the specific features of a vehicle, providing you with valuable knowledge needed for a quality repair.

FOLLOW A DETAILED REPAIR PLAN

From recalibrating steering angle sensors to resetting auto window functions, disconnecting and reconnecting the battery may not be as simple as it sounds. A detailed repair plan will ensure you follow the precise process required to restore a vehicle to factory standards. Following specific steps when disconnecting and reconnecting a battery and initializing or recalibrating affected electrical systems will ensure the repair is done correctly. A detailed repair plan will identify what you need to do before beginning work on the vehicle and will improve estimation and workflow.

Safely and properly repairing a vehicle after an accident is critical. The only way to ensure you've restored the vehicle to manufacturer specifications is to follow Toyota-recommended repair procedures and guidelines. 🛠️





IT'S GOOD TO BE GENUINE

GENUINE • QUALITY • RELIABILITY • FIT • VALUE

Toyota Genuine Radiators and Condensers provide uncompromising quality. They're meticulously designed for the perfect fit, engineered and tested by Toyota, and backed by our Toyota Genuine Warranty. And now, they're available for almost all Toyotas on the road, giving you the perfect blend of benefits to help increase your shop efficiency and profitability.

EXCLUSIVELY FROM YOUR TOYOTA DEALER



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For complete details about Toyota's warranties, please refer to the applicable Warranty & Maintenance Guide or see your Toyota Dealer.