Frame Members

3 Phase Inverter Spot Welder 254-00002
Compuspot 700F Welder 190-50080
I4 Inverter Spot Welder 254-000014
Inverter Welder with MIG Welder 254-00015

General Equipment

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Motorcraft® Metal Surface Prep</td>
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<tr>
<td>ZC-31-A</td>
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<tr>
<td>Motorcraft® Premium Undercoating</td>
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<td>PM-25-A</td>
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<tr>
<td>Motorcraft® Rust Inhibitor Aerosol</td>
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<td>PM-24-A</td>
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Material

Removal and Installation
Front Frame Section

NOTE: When carrying out service procedures to the frame, the anti-lock brake system hydraulic control unit (ABS/HCU) module bracket and fastener kit are required. Reference part number 7L3Z-2C325-C and make sure the latest level part is used.

WARNING: Never install used or reconditioned parts (as specified below) from pre-owned, salvaged or damaged vehicles. The use of such parts could lead to serious injury.

Never use non-Ford parts or accessories for completing repairs.

Ford Motor Company does not approve or recognize body and structural repair procedures, tools, parts or anything but new genuine Ford equipment. Ford cannot attest to the safety, quality, durability or legality of non-Ford parts or accessories. Use of such parts could lead to serious personal injury as they may contain damage which is not visible.

Ford does not approve use of the following:

^ Salvaged or used parts

^ Major body clips or assemblies from salvage vehicles

^ Aftermarket structural or body components

^ Salvaged or reconditioned wheels

^ Used supplemental restraint system (SRS) components
- air bags
- restraint system modules
- safety belts, buckles or retractors
- crash sensors

Returning a vehicle to pre-accident condition can only be assured if repair procedures are carried out by skilled technicians using new genuine Ford parts and Ford-approved methods. Structural component repair procedures approved by Ford, using genuine Ford parts, have been validated by Ford Motor Company engineers.

Ford Motor Company does not endorse, cannot attest to, and makes no representations regarding structural repairs (frames, rails, aprons and body panels) carried out using non-genuine Ford Motor Company parts or non-Ford-approved methods. In particular, Ford makes no representations that the vehicle will meet any crash safety or anti-corrosion performance requirement. Such parts and methods have not been tested by Ford, and may not meet Ford's requirements for safety, performance, strength, quality, durability and corrosion protection.

Ford Motor Company bears no responsibility or liability of any kind if repairs are performed using alternative structural component repair procedures and/or parts.

WARNING: Frame rail crush zones absorb crash energy during a collision and must be replaced if damaged. Straighten damaged frame rails to correct frame dimensions prior to frame member sectioning. Failure to follow these instructions may adversely affect frame rail performance and may result in serious personal injury to vehicle occupant(s).

WARNING: Invisible ultraviolet and infrared rays emitted in welding can injure unprotected eyes and skin. Always use protection such as a welder's helmet with dark-colored filter lenses of the correct density. Electric welding will produce intense radiation, therefore, filter plate lenses of the deepest shade providing adequate visibility are recommended. It is strongly recommended that persons working in the weld area wear flash safety goggles. Also wear protective clothing. Failure to follow these instructions may result in serious personal injury.

WARNING: Always wear protective equipment including eye protection with side shields, and a dust mask when sanding or grinding. Failure to follow these instructions may result in serious personal injury.

NOTICE: The front frame section service kit is available for vehicles with gross vehicle weight rating (GVWR) up to 8,000 lb. The front frame section is not serviceable for vehicles above 8,001 lb GVWR (Heavy Duty). The front frame stub kit is available for all frame applications. Failure to follow these instructions may affect collision energy management of the vehicle.

NOTE: Corrosion protection needs to be restored whenever it is necessary to sand or grind through painted surfaces or E-coat, or when bare metal repairs are made. For additional information, refer to Restoring Corrosion Protection Following Repair.

NOTE: Observe prescribed welding procedures when carrying out repairs to the frame assembly. For additional information, refer to Welding Precautions - Steel.

NOTE: The following steps provide instructions for removal and replacement of the entire front frame section up to the mid-rail joint.

1. Remove the bumper For additional information, refer to Bumpers.

2. Unbolt and remove the front bumper reinforcing beam.
3. Remove the grille assembly and reinforcement.

4. Remove the front fenders. For additional information, refer to Front End Body Panels.

5. Remove the front skid plate (if equipped). For additional information, refer to Front Drive Axle/Differential.

6. Remove the engine mount retaining bolts and loosen the exhaust manifold-to-cylinder head fasteners. For additional information, refer to Engine System - General Information.

7. Loosen the radiator shroud retainer bolts. For additional information, refer to Engine Cooling.

8. Anchor the vehicle to a frame rack following the manufacturer's instructions.

   \(^\) Remove the front wheels. For additional information, refer to Wheels and Tires.

9. **NOTE:** All body alignment measurements are carried out with the vehicle detrimmed. Measurements are made metal to metal, on center unless otherwise specified.

   Measure the vehicle to determine if the body and frame requires straightening and alignment. For additional dimensional information, refer to Body.

10. Carry out complete removal of front suspension and steering components including upper and lower control arms, steering gear, steering linkages, sway bar, springs and shocks. For additional information, refer to Front Suspension - Rear Wheel Drive, Front Suspension - Four Wheel Drive (4WD) and Power Steering.

11. Remove the front drive axle and half shafts. For additional information, refer to Front Drive Axle/Differential.

12. Raise and support the engine/transmission assembly and remove the transmission support crossmember. For additional information, refer to Full Frame and Body Mounting.

   \(^\) Inspect the transmission crossmember for twists, bends or cracks.

13. Loosen the body mount-to-frame bushing bolts from the radiator support and the forward cab support. For additional information, refer to Full Frame and Body Mounting.

14. Using the frame rack towers and light tension, support the front radiator support of the vehicle by raising it slightly above the frame rail mounts.

15. Disconnect and remove any remaining wiring, lines, and related fittings from the frame section.

16. **NOTE:** The front frame section is retained by welded lap joints. This procedure calls for grinding of the original welded joints for removal, followed by welding the section into position.

   Using a plasma cutter, reciprocating saw or cut-off wheel, remove the damaged front frame horn section. Do not cut directly along the weld line. Leave enough material on the front side of the weld line to allow the edge to be ground back exactly to the line. This is necessary to make sure of correct fit between the frame and the replacement frame section.

17. Grind off the excess welding material that remains in front of the weld line on the existing frame.

   \(^\) Remove only the weld material. Do not grind out the center frame rail that must be reused.

18. Using an air chisel with a sharp one inch wedge-type chisel, separate the ground area of the joints.
19. With help of an assistant, remove the complete front section of the frame.

20. Using a wire brush or sandpaper, remove the E-coat from the outer surfaces of the replacement service section within approximately 15 mm (0.59 in) of the repair joint.

   Using a wire brush, remove any foreign material from the frame within approximately 15 mm (0.59 in) of the repair joint.

21. With the help of an assistant, position the new frame section into place on the vehicle and support with jackstands or a transmission style jack.

   Loosely clamp the replacement section in a preliminary position.

22. Carry out frame measurements to verify correct position of the replacement section and clamp firmly into position. For additional dimensional information, refer to Body.

23. Make sure the repair joint and surrounding repair area have attained a minimum temperature of 10°C (50°F) before carrying out weld.

24. Weld the joint completely, if fit and alignment are correct, using a metal inert gas (MIG) welding machine capable of producing a minimum of 200 amps. Use 0.9-0.11 mm (0.35-0.045 in) ER70S-3 or equivalent weld wire that is compatible with SAE 1010 steel.

25. Use a dye penetrant to determine if any cracks or large voids exist in the weld joint. If cracks or other defects exist, grind out the defect and repair until the weld is free of defects.

   Clean the repair area with metal surface cleaner and apply anti-corrosion coating to the affected areas of the frame and service replacement section.

26. Reinstall the transmission crossmember and the lower engine/transmission assembly, and tighten fasteners to correct specification.

27. Inspect for damage and reinstall the suspension, steering and driveline components previously removed.

28. Remove the vehicle from the frame rack and carry out reassembly and installation of any remaining components.