

SECTION 501-35: Body Repairs
REMOVAL AND INSTALLATION

2014 F-150 Workshop Manual
Procedure revision date: 10/25/2013

Frame Members — Front Frame Section

Special Tool(s)

 ST3049-A	Rust Inhibitor Installation Kit 286-00002
 ST3048-A	Undercoating Spray Gun 286-00001

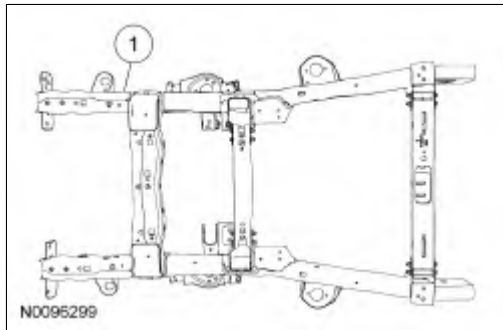
General Equipment

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

Material

Item	Specification
Motorcraft® Metal Surface Prep ZC-31-A	—
Motorcraft® Premium Undercoating PM-25-A	—
Rust Inhibitor ValuGard™ VG104, VG104A (aerosol)	—

Front Frame Section



Item	Part Number	Description
1	5E029	Front frame section kit

WARNING: Collision damage repair must conform to the instructions contained in this workshop manual. Replacement components must be new, genuine Ford Motor Company parts. Recycled, salvaged, aftermarket or reconditioned parts (including body parts, wheels or safety restraint components) are not authorized by Ford.

Departure from the instructions provided in this manual, including alternate repair methods or the use of substitute components, risks compromising crash safety. Failure to follow these instructions may adversely affect structural integrity and crash safety performance, which could result in serious personal injury to vehicle occupants in a crash.

WARNING: Frame rail crush zones absorb crash energy during a collision and must be replaced if damaged. Prior to replacement of frame rail crush zones, straighten damaged frame rails to correct frame dimensions. Failure to follow these instructions may adversely affect frame rail crush zone performance and may result in serious personal injury to vehicle occupants in a crash.

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.

NOTE: Observe prescribed welding procedures when carrying out repairs to the frame assembly. For additional information, refer to [Welding Precautions — Steel](#) in this section.

- 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 requires straightening and alignment. The vehicle must be restored its correct overall dimensions prior to beginning this procedure. For body dimensional information, refer to [Body](#) in this section.

- Remove the bumper assembly. For additional information, refer to [Section 501-19](#).
- Remove the grille assembly and reinforcement.

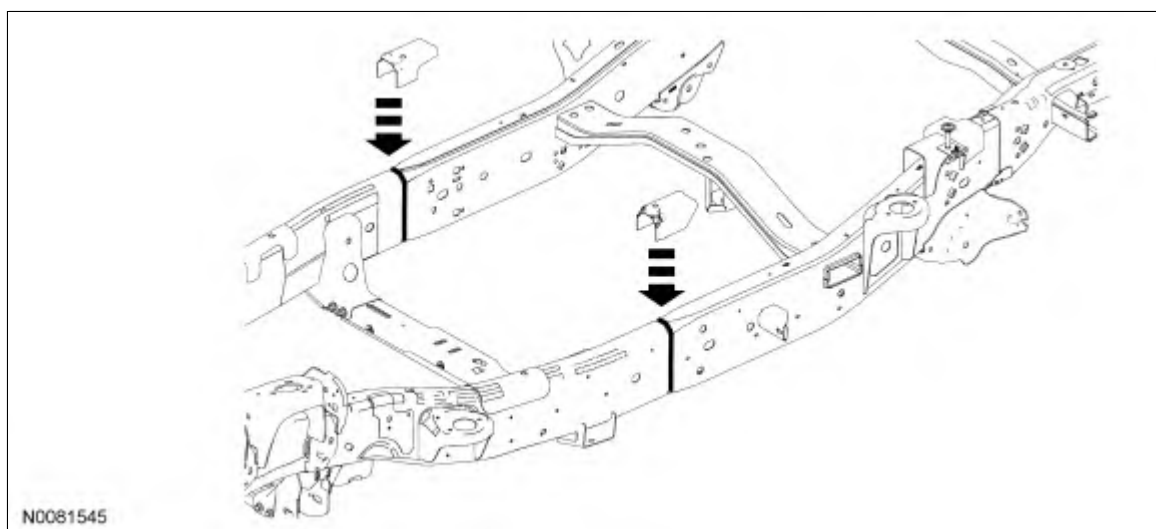
4. Remove the front fenders. For additional information, refer to [Section 501-02](#).
5. Remove the front skid plate (if equipped). For additional information, refer to [Section 205-03](#).
6. Remove the engine mount retaining bolts and loosen the exhaust manifold-to-cylinder head fasteners. For additional information, refer to [Section 303-00](#).
7. Loosen the radiator shroud retainer bolts. For additional information, refer to [Section 303-03](#).
8. Anchor the vehicle to a frame rack following the equipment manufacturer's instructions.
 - Remove the front wheels. For additional information, refer to [Section 204-04](#).
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](#) in this section.

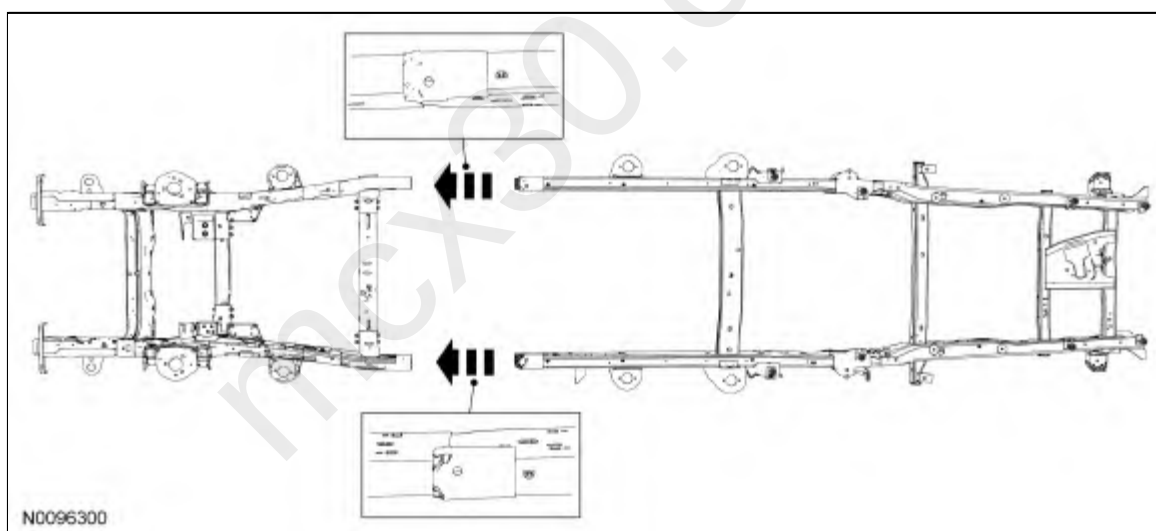
10. Carry out complete removal of front suspension and steering components including upper and lower control arms, steering gear, steering linkages, sway bar, springs and shocks. For additional information, refer to [Section 204-01A](#), [Section 204-01B](#) and [Section 211-02](#).
11. Remove the front drive axle and half shafts. For additional information, refer to [Section 205-03](#).
12. Raise and support the engine/transmission assembly and remove the transmission support crossmember. For additional information, refer to [Section 502-02](#).
 - 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 [Section 502-02](#).
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. **NOTICE:** Do not damage the center side rail during removal, it will be reused. Only cut through the depth of the weld, as the center rail underlaps the front frame rail.

NOTE: The front frame section is retained by welded lap joints and an additional reinforcement bracket at the section joint. 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.

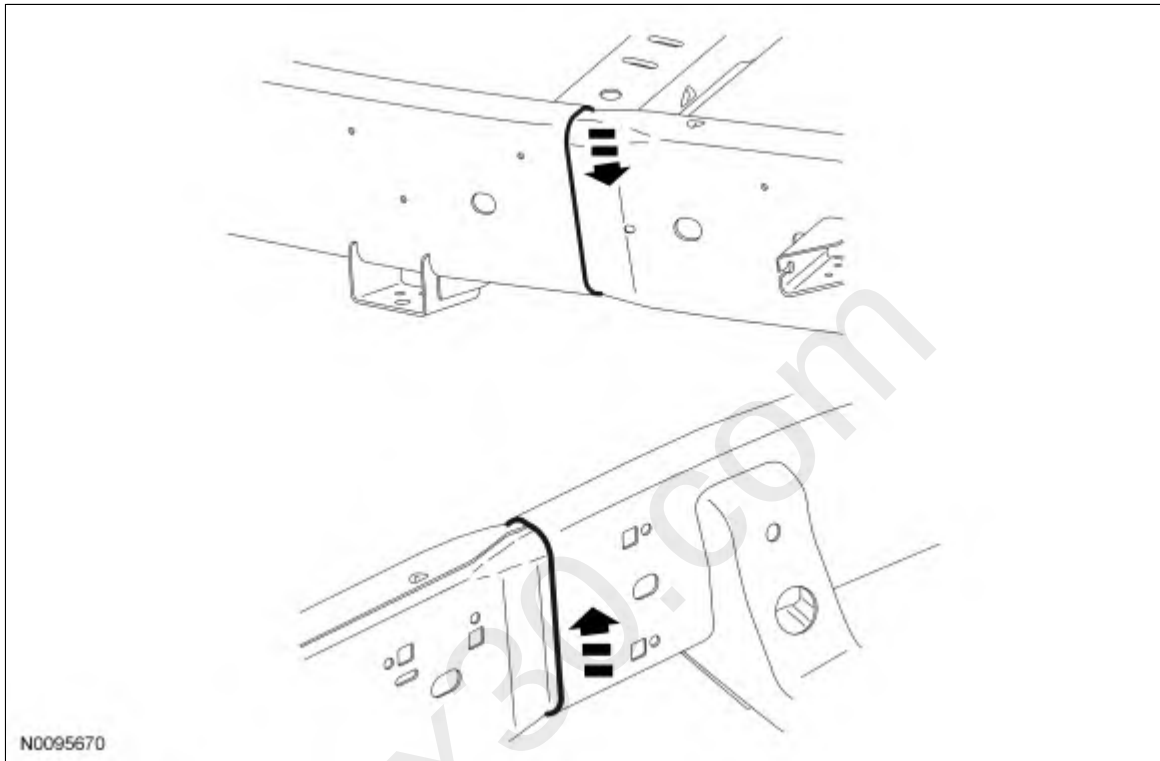


17. Grind off the excess welding material that remains in front of the weld line on the existing frame.
 - Remove only the weld material. Do not grind out the center frame rail that must be reused.
18. Using an air chisel with a sharp one-inch wedge-type chisel, separate the ground area of the joints.
19. With help of an assistant, remove the complete front section of the frame.



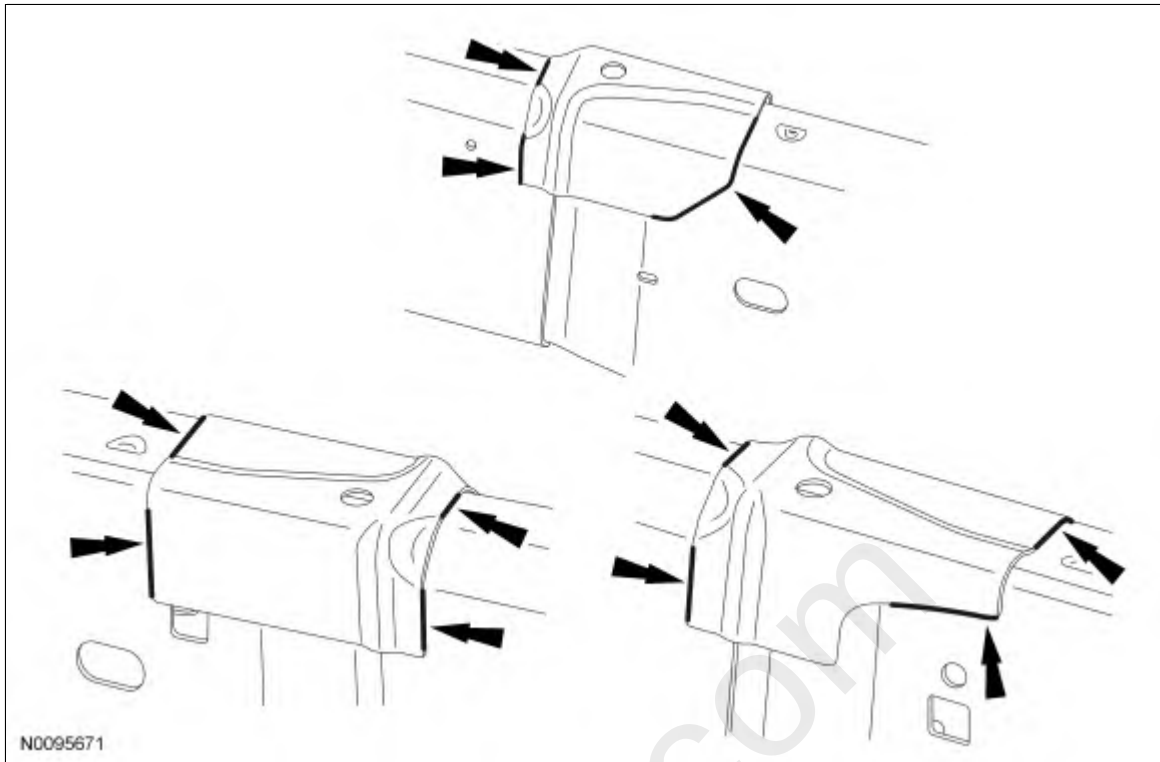
20. Using a wire brush or sandpaper, remove the E-coat from the outer surfaces of the replacement service section within approximately 15 mm (0.59 in) of the repair joint.
 - Using a wire brush, remove any foreign material from the frame within approximately 15 mm (0.59 in) of the repair joint. Clean the surface with metal surface prep or equivalent.
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](#) in this section.
 - Apply a weld-through primer locally in the areas to be welded.

23. Make sure the repair joint and surrounding repair area have attained a minimum temperature of 10°C (50°F) before carrying out the weld procedure.
24. Weld the joint completely around the front-to-center rail joints, if fit and alignment are correct, using a Metal Inert Gas (MIG) welding machine capable of producing a minimum of 200 amps. Use 0.9-1.1 mm (0.035-0.045 in) ER70S-3 or equivalent weld wire that is compatible with mild (Society of Automotive Engineers (SAE) 1010) steel.



25. **NOTE:** Illustration indicates weld locations for outboard and inboard reinforcement of the left hand and right hand reinforcements.

Position the reinforcement brackets at the section joint in the original location. Clamp in place, apply a weld-through primer and weld the brackets as indicated.



26. 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. For additional information regarding corrosion protection, refer to [Restoring Corrosion Protection Following Repair](#) in this section.
 27. Reinstall the transmission crossmember and the lower engine/transmission assembly, and tighten fasteners to correct specification.
 28. Inspect for damage and reinstall the suspension, steering and driveline components previously removed.
 29. Remove the vehicle from the frame rack and carry out reassembly and installation of any remaining components.
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