

FORD:

2000-2006 Crown Victoria, Focus, Mustang,
Taurus
2002-2005 Thunderbird
2005-2006 Five Hundred, Ford GT, Freestyle
2006 Fusion
2000-2003 Explorer Sport, Windstar
2000-2005 Excursion
2000-2006 E-Series, Expedition, Explorer,
F-150, F-Super Duty, Ranger
2001-2005 Explorer Sport Trac
2001-2006 Escape
2004-2006 Freestar
2005-2006 Escape Hybrid
2000-2006 F-650, F-750
2006 Low Cab Forward

LINCOLN:

2000-2006 LS, Town Car
2006 Zephyr
2000-2006 Navigator
2002-2003 Blackwood
2003-2005 Aviator
2006 Mark LT

MERCURY:

2000-2002 Cougar
2000-2005 Sable
2000-2006 Grand Marquis
2005-2006 Montego
2006 Milan
2000-2006 Mountaineer
2004-2006 Monterey
2005-2006 Mariner
2006 Mariner Hybrid

This article supersedes TSB **03-11-6** to update the service procedure, vehicle lines and model years.

ISSUE

Wire harness repairs are supported through the availability of individual components such as:

- Wire terminals with machine crimped pigtailed
- Hard shell connectors
- Dual wall heat shrink tubing
- Complete, loaded, wiring pigtail kits

Some of the available tools and service parts that are helpful when performing wiring harness repairs are:

- Motorcraft Wiring Pigtail Catalog (see www.motorcraft.com for more information)
- Rotunda Wire Splice Toolkit 164-R5903 (order through 1-800-Rotunda)
- General Wire Terminal Repair Kit (order through Ford Component Sales)

NOTE: The information in Technical Service Bulletins is intended for use by trained, professional technicians with the knowledge, tools, and equipment to do the job properly and safely. It informs these technicians of conditions that may occur on some vehicles, or provides information that could assist in proper vehicle service. The procedures should not be performed by "do-it-yourselfers". Do not assume that a condition described affects your car or truck. Contact a Ford, Lincoln, or Mercury dealership to determine whether the Bulletin applies to your vehicle. Warranty Policy and Extended Service Plan documentation determine Warranty and/or Extended Service Plan coverage unless stated otherwise in the TSB article. The information in this Technical Service Bulletin (TSB) was current at the time of printing. Ford Motor Company reserves the right to supersede this information with updates. The most recent information is available through Ford Motor Company's on-line technical resources.

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Information on the pigtail and terminal repair kits can also be accessed by technicians via the PTS web site. To access on PTS:

- Select the year/model of the vehicle on the PTS home page
- Select the wiring tab
- Select the link to the pigtail or terminal repair kit at the top right of screen.

Additional service information contained in this TSB detailing wire folding, soldering, and crimping techniques may be helpful.

ACTION

REPAIR VS REPLACEMENT

The approved procedure is to repair wiring harnesses with pigtail kits, wire terminals, or hard shell connectors when available. The only exceptions to this procedure are when:

- The repair cost exceeds the cost to replace the wiring harness
- There are no component parts released to service the wiring harness

RESTRAINTS RELATED WIRING REPAIRS

If restraints connectors or wiring circuits are contained in a stand-alone harness, do not repair them; replace the restraints harness unless directed to repair the circuit by a TSB or other Ford Motor Company publication.

If restraints connectors or wiring circuits are contained in the main vehicle wiring harnesses (14401, 14A005, etc.), they should be repaired using the solder and heat-shrink repair procedure specified in this TSB. The General Wire Terminal Repair Kit contains gold plated terminated pigtails (with white insulation) and dual wall heat shrink tubing to perform these repairs. Loaded wiring pigtail kits with gold plated terminals are also available in the parts catalog.

SERVICE TIPS

Refer to applicable model year wiring diagrams for circuit information.

Twisted Wire Circuits

For "Twisted Wire" circuit repair (Figure 1), the twisting must not be disrupted for more than 2" (51 mm) Twist the repaired wires in the same direction and with the same general twist rate as the original wiring. Reapply the shielding on shielded circuits.

Stagger the repairs to minimize harness diameter and maintain harness length (Figure 2).

Any leads that are not going to be used need to be sealed with dual wall heat shrink and stowed (Figure 2). Silicone must not be used.

Excess wire from the harness can be folded back on itself to maintain the harness length.

Reapply any convolute and tape that was removed to make the repair.

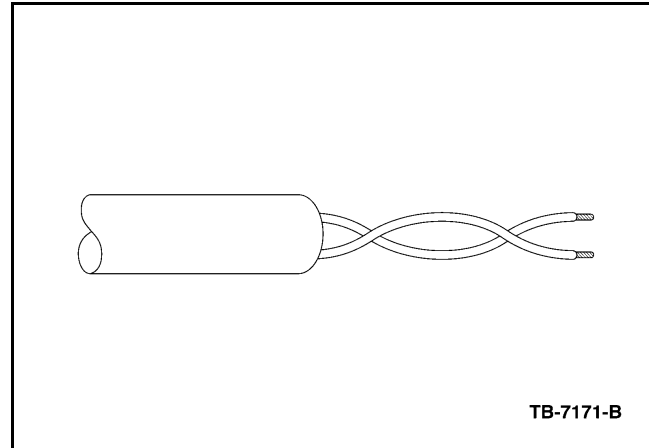


Figure 1 - Article 05-18-7

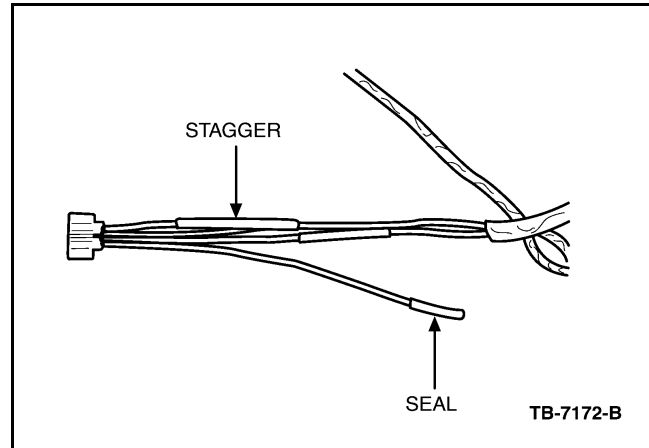


Figure 2 - Article 05-18-7

For 16 AGW and Smaller Diameter Wire

1. Strip 1 1/2" (37.2mm) of insulation from Wire #1 and 3/4" (19.5mm) of insulation from Wire #2, taking care not to nick or cut wire strands (Figure 3). Pull wire straight from stripper. If wire is pulled at an angle, wire strands may be cut off. If more than one (1) strand is cut off during stripping, cut off the end and re-strip.

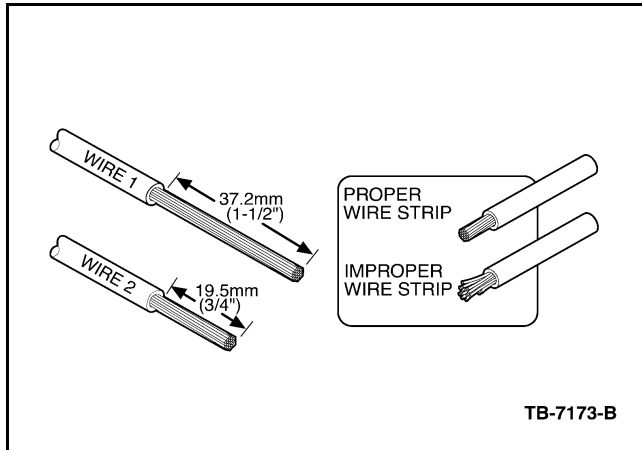


Figure 3 - Article 05-18-7

2. Install heat shrink tubing at least 1" (26 mm) away from one of the stripped ends being spliced. Twist wires together. Solder wires together (Figure 4).

NOTE

USE ROSIN CORE MILDLY ACTIVATED (RMS) SOLDER. DO NOT USE ACID CORE SOLDER FOR WIRE REPAIR.

3. Bend Wire #1 back in a straight line for sealing (Figure 4). Inspect solder joint bond.

NOTE

WAIT FOR SOLDER TO COOL BEFORE MOVING WIRES.

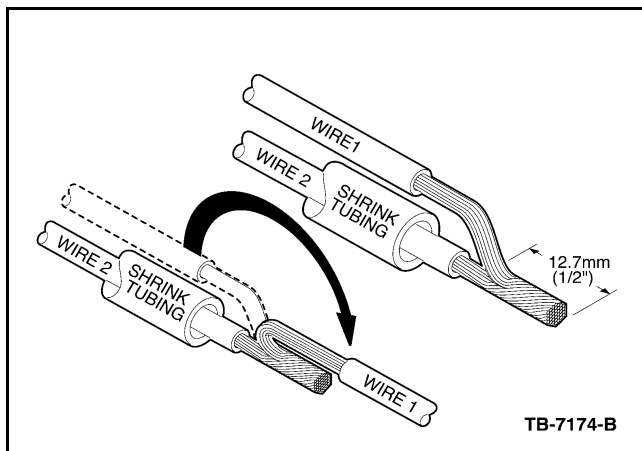


Figure 4 - Article 05-18-7

4. Evenly position heat shrink tubing over wire repair (Figure 5).

NOTE

OVERLAP TUBING ON BOTH WIRES.

5. Use a shielded heat gun to heat the entire length of the heat shrink tubing until the hot melt appears from both ends of the tubing. Durability of a heat shrink tubing splice is dependent on the hot melt that will appear from both ends of the tube. The hot melt forms an adhesive seal between the wire insulation and the heat shrink tubing, which prevents air and moisture from entering the solder point (Figure 5).

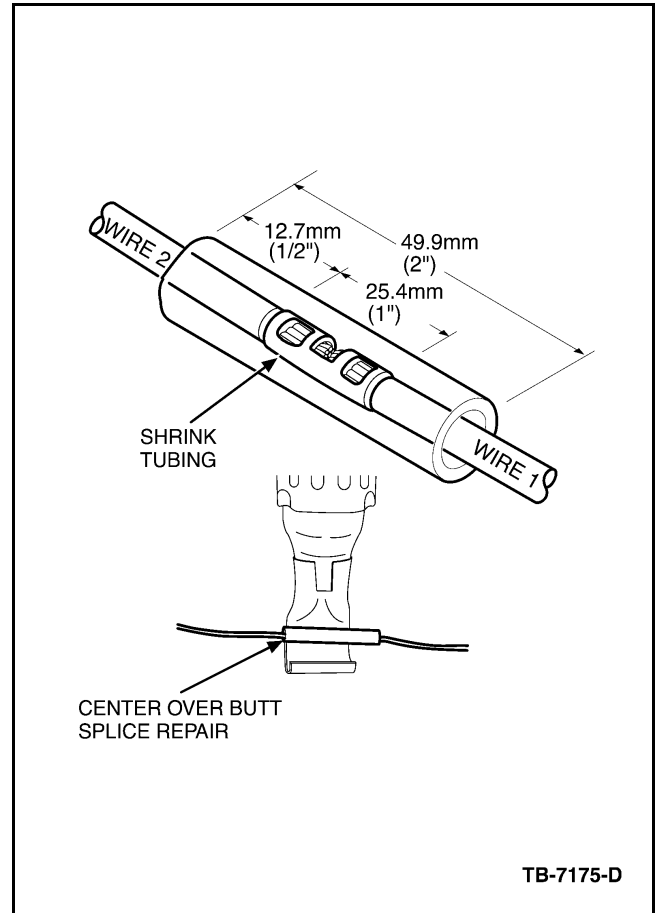


Figure 5 - Article 05-18-7

For 14 AGW and Larger Diameter Wire (Excluding Restraints Wiring Repairs)

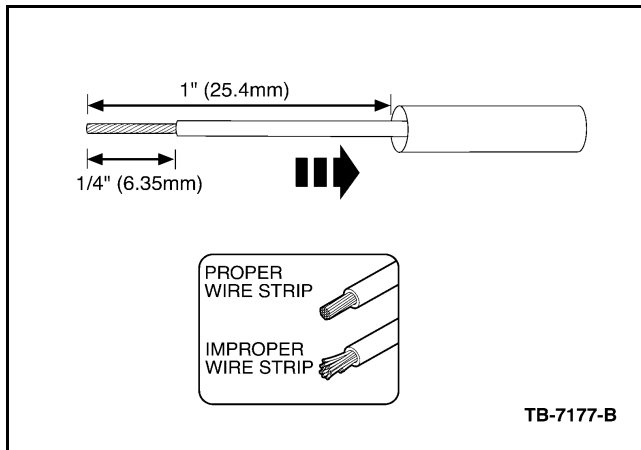
1. Strip 1/4" (6.35mm) of insulation from pigtail wire end once the wire lengths are sized so repairs can be staggered. Take care not to nick or cut wire strands. Pull wire straight from stripper. If wire is pulled at an angle, wire strands may be cut off. If more than one (1) strand is cut off during stripping, cut off the end and re-strip.

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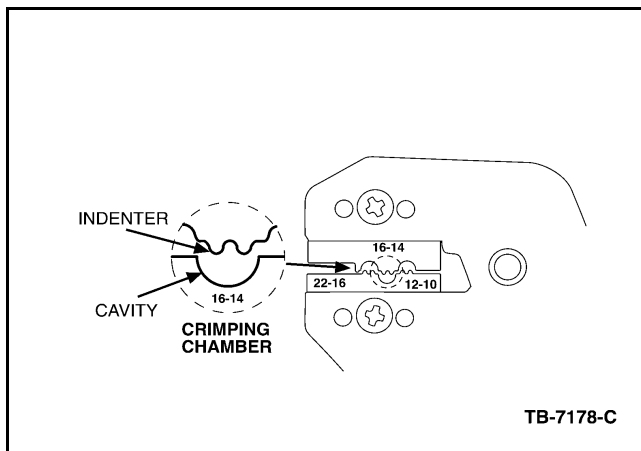
NOTE

THE STRIP LENGTH WILL VARY DEPENDING ON THE BUTT SPLICE AND WIRE IN HARNESS. LONGER STRIP LENGTHS ARE REQUIRED WHEN THE WIRE NEEDS TO BE FOLDED TO MATE WITH THE BUTT SPLICE. REFER TO FIGURE 10 CHART FOR STRIP LENGTHS AND FOLDING TECHNIQUES.

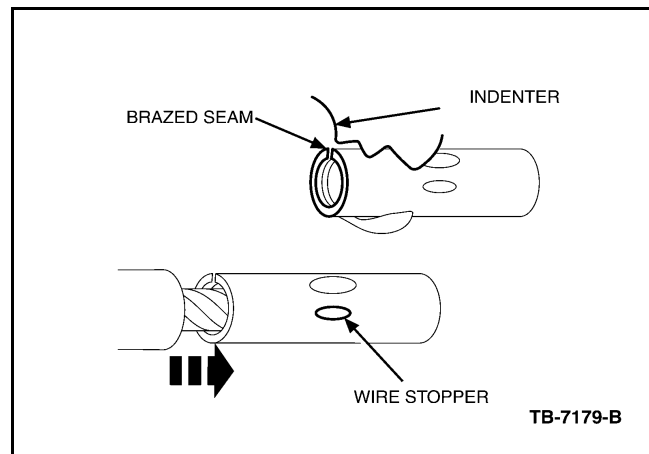
- Slide heat shrink tubing onto one (1) of the wire ends to be crimped, must be at least 1" (25.4mm) away from stripped end (Figure 6).



- Identify the appropriate crimping chamber of the Rotunda 164-R5901 Pro-Crimper (or equivalent) by matching the wire size on the dies with the wire size stamped on the butt splice (Figure 7). Hold the crimping tool so the identified wire sizes are facing you. Squeeze tool handles together until the ratchet releases, then allow the jaws of the tool to open fully.



- Center one (1) end of the butt splice on the appropriate crimping chamber. If visible, be sure to place the brazed seam of the butt splice toward the indenter (Figure 8).
- Hold the butt splice in place and squeeze the tool handles together until the ratchet engages sufficiently to hold the butt splice in position (typically one (1) or two (2) clicks). DO NOT deform the butt splice.
- Insert stripped wire into the butt splice, making sure the insulation on wire does not enter the butt splice (Figure 8).



- Holding the wire in place, squeeze tool handles together until ratchet releases. Allow tool handles to open, then remove crimped butt splice.
- To crimp the other half of the splice, reposition the un-crimped wire barrel in the same crimping chamber, and repeat Steps 3-8. If splice cannot be turned for crimping the other half, turn the tool around.
- Check for acceptable crimp.
 - Crimp should be centered on each end of the butt splice. It is acceptable for crimp to be slightly off center, but not off the end of the butt splice (Figure 9-a).
 - Wire insulation does not enter butt splice. Wire is flush with or extends slightly beyond end of butt splice (Figure 9-b).
 - Wire is visible through inspection hole of splices (Figure 9-c).

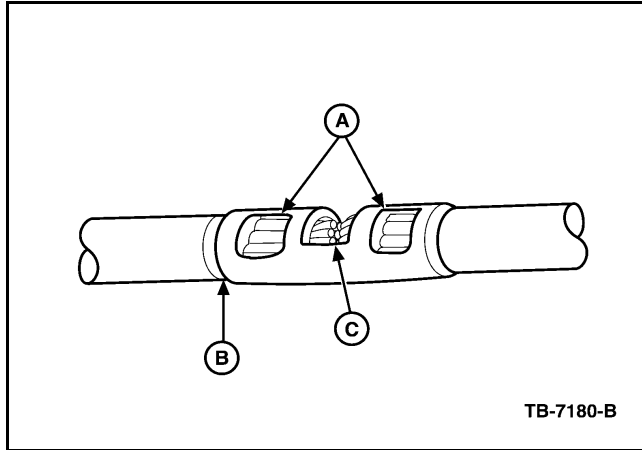


Figure 9 - Article 05-18-7

10. Evenly position heat shrink tubing over wire repair (Figure 5).

NOTE

OVERLAP TUBING ON BOTH WIRES.

11. Use a shielded heat gun to heat the entire length of the heat shrink tubing until the hot melt appears from both ends of the tubing. Durability of a heat shrink tubing splice is dependent on the hot melt that will appear from both ends of the tube. The hot melt forms an adhesive seal between the wire insulation and the heat shrink tubing, which prevents air and moisture from entering the solder point (Figure 5).

Wire Gauge Size		Wire Gauge Size							
		10	12	14	16	18	20	22	24
Butt Splice as stamped	22-18		1/4" strip, cut 9 strands	1/4" strip, cut 2 strands	1/4" strip, no fold	1/4" strip, no fold	1/4" strip, no fold	5/8" strip, fold 2x dia.	1" strip, fold 3x dia.
	16-14	1/4" strip, cut 7 strands	1/4" strip, no fold	1/4" strip, no fold	1/4" strip, no fold	5/8" strip, fold 2x dia.	1" strip, fold 3x dia.	1 1/4" strip, fold 4x dia.	
	12-10	1/4" strip, no fold	1/4" strip, no fold	5/8" strip, fold 2x dia.	1" strip, fold 3x dia.	1 1/4" strip, fold 4x dia.			

Pigtail Only
 Both Pigtail and Wire Harness
 Wire Harness Only

2X CROSS SECTION **3X CROSS SECTION** **4X CROSS SECTION**

Figure 10 - Article 05-18-7

WARRANTY STATUS: Information Only