

Constellation	> 49X
Heritage	5700
4700	5900
4800	6900
4900	

General Information

This bulletin contains information required to replace 104-way connector wires or terminals using the properly sized pigtail, as documented in the kit listed in the repair portion of the bulletin. See [Fig. 1](#) and [Fig. 2](#) for examples of the 104-way connector. Before replacing a terminal using pigtail kits, remove the terminals from the connector following the guidelines in **Section 54.00, Subject 140** of the *49X Workshop Manual*.

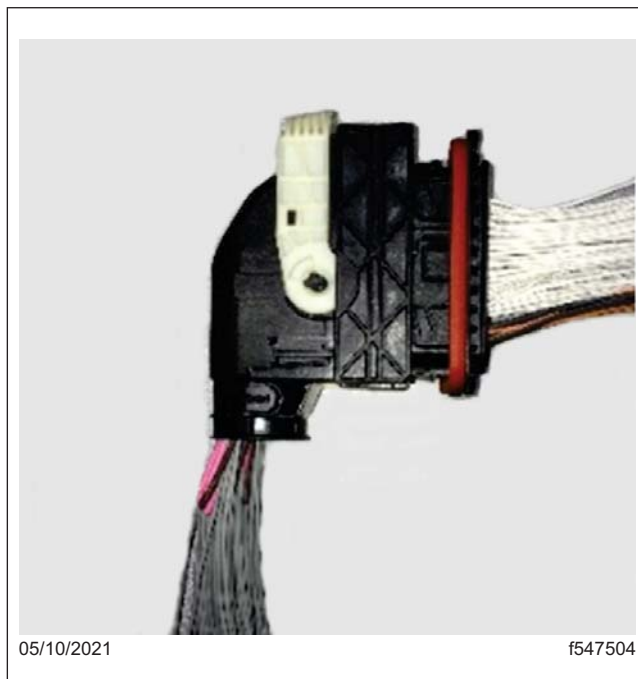


Fig. 1, 104-Way Connector, Locked



Fig. 2, 104-Way Connector, Unlocked



Fig. 3, Label 24-02065-000

NOTE: Service label part number 24-02065-000 should be installed on the chassis-side cover back shell, as shown in [Fig. 3](#), alerting users to service information within this service bulletin. If the label is not installed or is unreadable, it should be replaced by ordering part 24-02065-000 through DTNA Connect:

- Navigate to the 'DTNA Publications' page of DTNA Connect.
- Select 'Western Star.' See [Fig. 4](#).

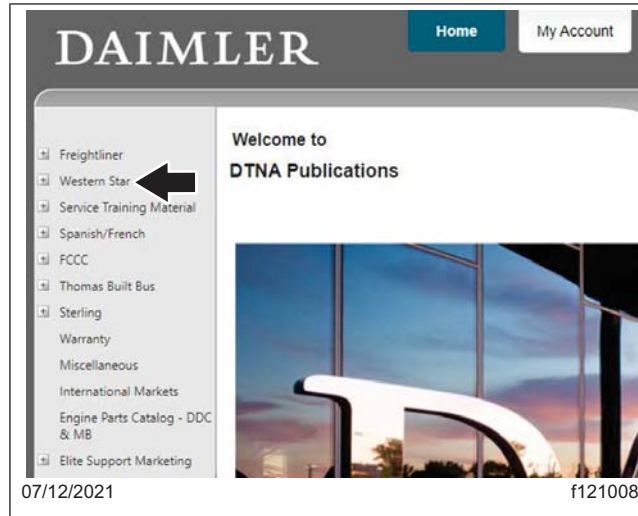


Fig. 4, Western Star

- Select 'Miscellaneous Items.' See [Fig. 5](#).

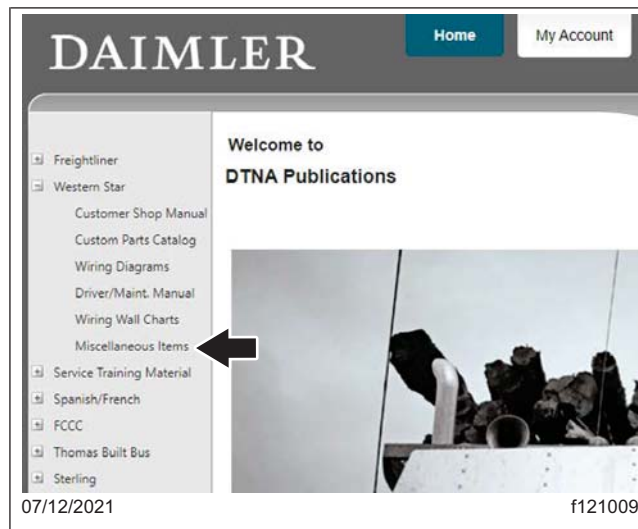


Fig. 5, Miscellaneous Items

- Locate item 24-02065-000 'Notice Label sbw_079.'
- Select 'Place an Order.' See [Fig. 6](#).

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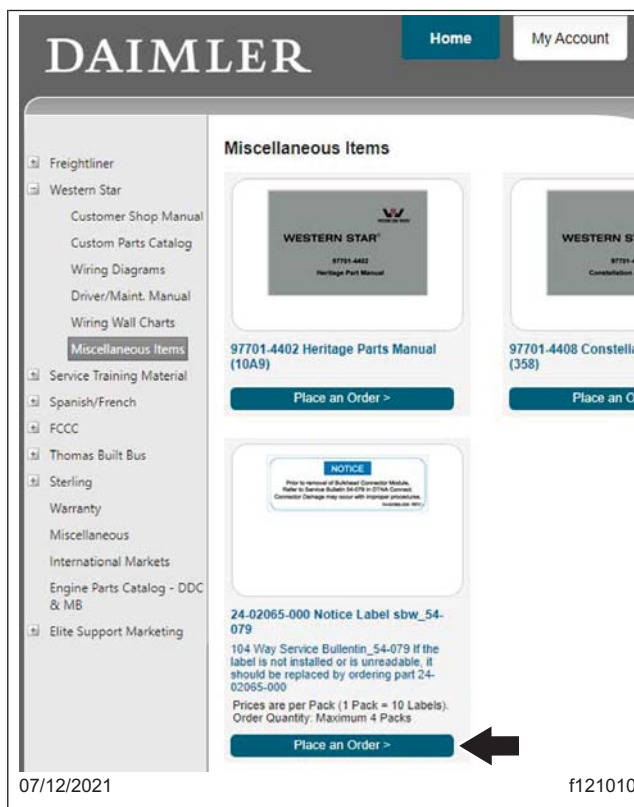


Fig. 6, 'Place an Order' Button

Wiring Repair Instructions

1. Select the appropriate repair pigtail for the terminal size, wire size, seal size, and connector cavity location, as shown in [Fig. 7](#). Pigtail repair kit AFL DK00001 000 was created to assist with the proper repair and installation of additional connections at the 104-way connector. Use pigtails when populating unused cavities, or servicing damaged or defective terminals and seals within the connector. See [Table 1](#) for a list of parts included in kit AFL DK00001 000.



Fig. 7, Crimping Tool and Kit ESY ES66 404

Pigtail Repair Kit Parts								
Location	Cavity Position	Gauge	Terminal Size	Terminal Part Number	Seal Part Number	Wire Part Number	Length (inches)	Quantity
Cab	1-94	16T	1.2	23-13214-832	23-12497-431	48-25085-109	16	25
	98-102	16T	2.8	23-13214-752	23-12497-411	48-25085-109	8	2
	98-102	12T	2.8	23-13214-752	23-12497-410	48-25085-309	8	2
	95, 96, 103, 104	10T	2.8	23-13214-757	23-12497-413	48-25085-509	8	2
Chassis	1-94	16T	1.2	23-13214-822	23-12497-431	48-25085-109	16	25
	98-102	16T	2.8	23-13214-861	23-12497-411	48-25085-109	8	2
	98-102	12T	2.8	23-13214-865	23-12497-410	48-25085-309	8	2
	95, 96, 103, 104	10T	2.8	23-13214-866	23-12497-413	48-25085-509	8	2

Table 1, Pigtail Repair Kit Parts

1.1 When repairing a terminal/wire using the pigtail kit, select an equal or larger wire size for the repair. Never install pigtail with a wire size smaller than the original wire being replaced. Additionally only cavities 95, 96, 103, and 104 can be used for larger 12 and 10 gauge wires. See [Fig. 8](#) and [Fig. 9](#) for examples of cab-side cavity locations. See [Fig. 10](#) and [Fig. 11](#) for examples of chassis-side cavity locations.

- Small 1.2 terminals are located in cavities 1 to 94, with wire sizes ranging from 22 to 16 gauge.
- Large 2.8 terminals are located in cavities 95 to 104, with wire sizes ranging from 20 to 10 gauge.

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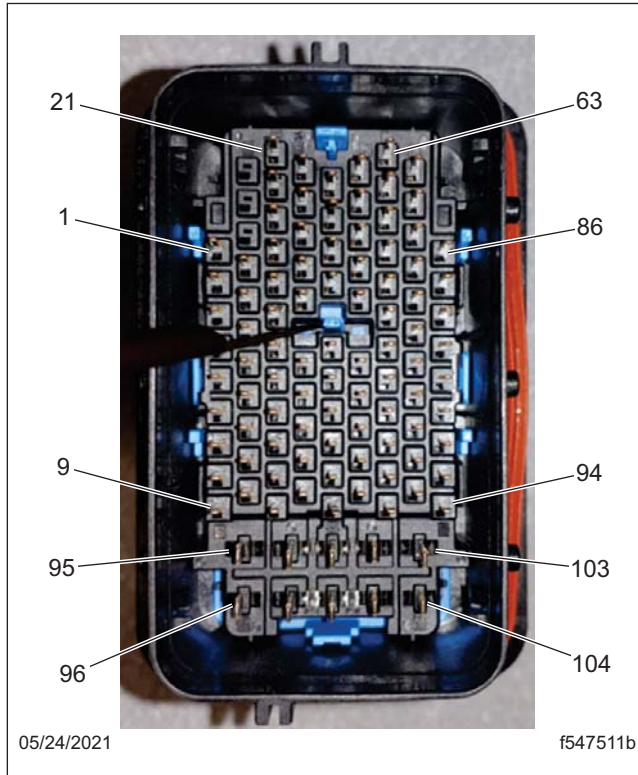


Fig. 8, Cab-side Cavity Locations (Front)

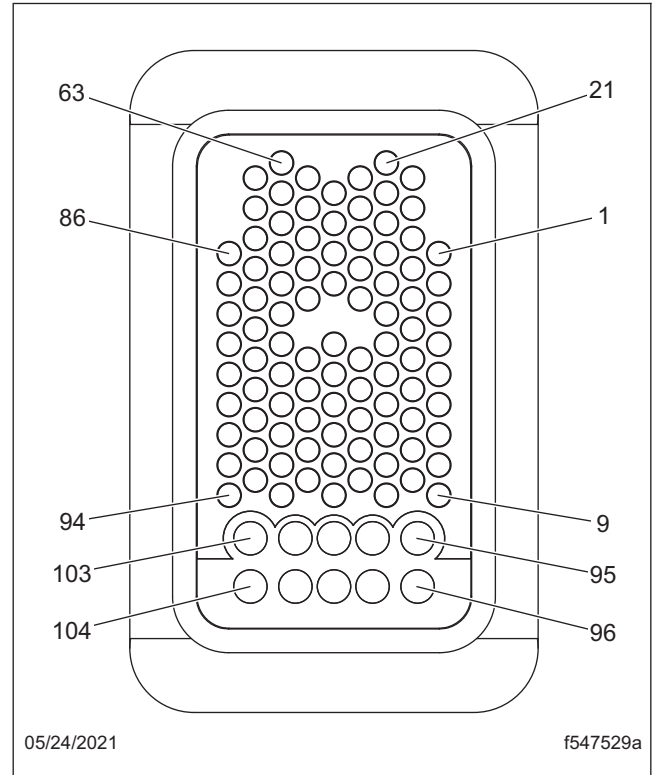


Fig. 9, Cab-Side Cavity Locations (Rear)

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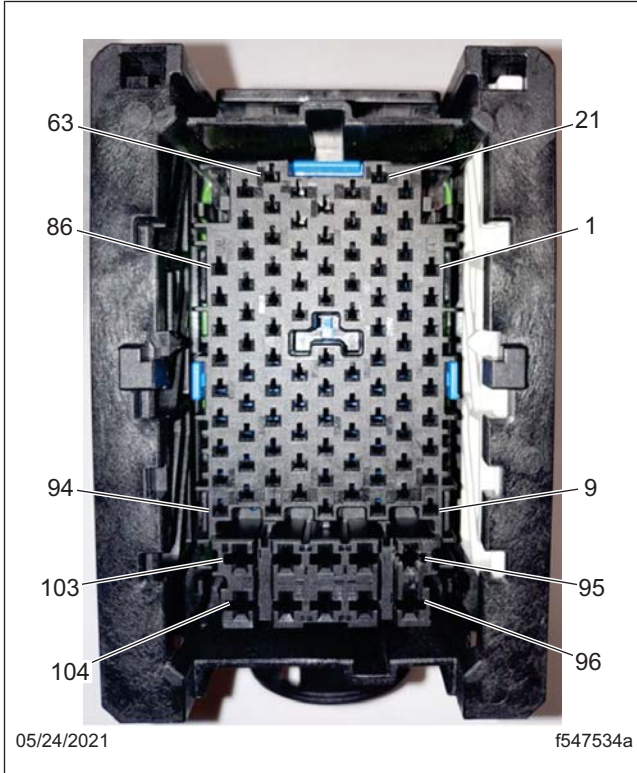


Fig. 10, Chassis-Side Cavity Locations (Front)

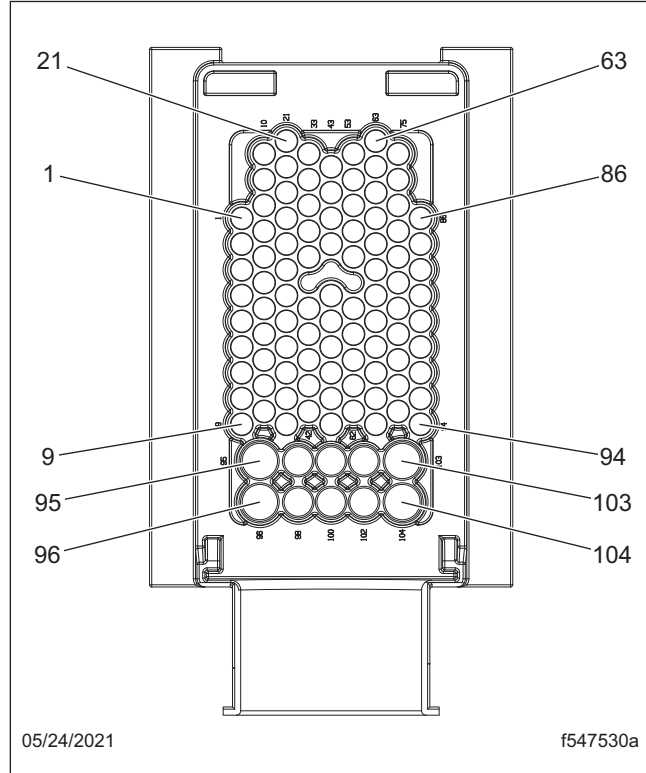


Fig. 11, Chassis-Side Cavity Locations (Rear)

2. Cut off the wire or terminal being replaced. The cut point should be within the length of the new pigtail wire length, and allow for staggered location of butt splices when multiple pigtails are being installed, in order to reduce overall harness bundle size.
3. Select the appropriate butt splice size based on the wire sizes being connected. See [Table 2](#) and [Fig. 12](#).

Crimp and Solder Connector Parts			
Description	Part Number	Gauge	Package Quantity
STA-DRY™ Yellow splice	PHM 1 1861	10–12	25
STA-DRY™ Blue splice	PHM 1 1862	14–16	25
STA-DRY™ Red splice	PHM 1 1863	18–22	25
STA-DRY™ Yellow/Blue step-down splice	PHM 1 1727	10/12-14/16	10
STA-DRY™ Blue/Red step-down splice	PHM 1 1728	14/16-18/22	10
DTNA Butt Splice Kit	ESY ES66 404	14–16	50

Table 2, Crimp and Solder Connector Parts

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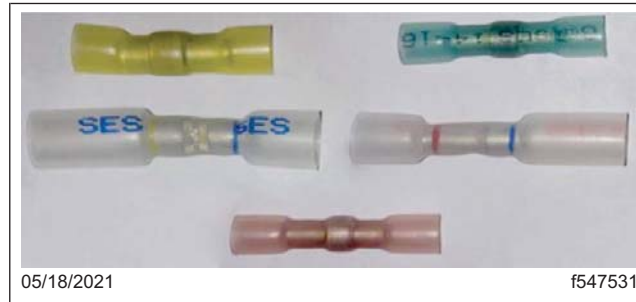


Fig. 12, STA-DRY™ Butt splices

- Two repair procedures are outlined below. One is for wire repair using kit ESY ES66 404. The other is for repairs using Phillips STA-DRY® Crimp and Solder Connectors. Choose and follow a procedure appropriate for the type of crimp or solder butt connector used. During the heat-shrink process, fully shrink both sides of the tubing to the wire, in order to completely seal the connection from moisture and corrosion. For external wire repairs on the chassis-side connector, always apply two layers of shrink tube for added moisture and corrosion protection.

Failure to properly crimp, solder, heat-shrink, or seal the pigtail butt connector could result in poor wiring connections and sealing. This will cause inadequate electrical continuity, or moisture and corrosion, which will degrade the quality of the wiring connection. See [Fig. 13](#) and [Fig. 14](#) for examples of improper seals.



Fig. 13, Incorrectly Sealed Solder Sleeve

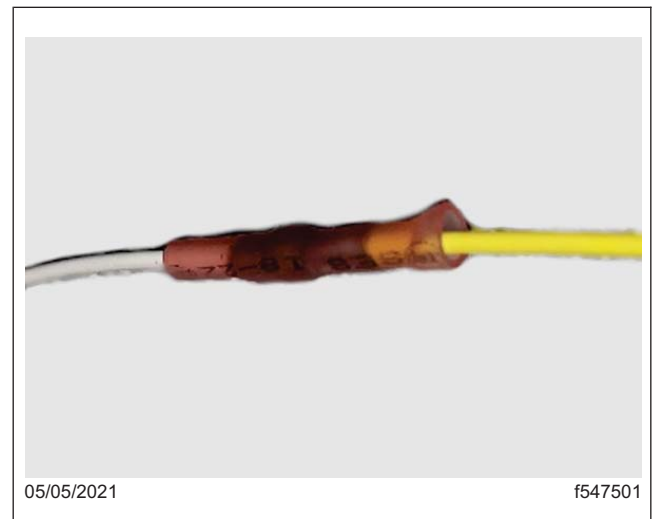


Fig. 14, Incorrectly Sealed Splice Connector

Wiring Repair Using Daimler Trucks North America (DTNA) Kit ESY ES66 404

- Prepare the wires to be spliced by stripping the insulation to expose 1/4 inch of copper, as shown in [Fig. 15](#). Slide a piece of the shrink tubing onto one of the wires.



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Fig. 15, Tube Sleeve, Solder Sleeve, Barrel Connector, and Prepared Wires

2. Slide a shrinkable solder sleeve onto one of the wires.
3. Place the wires that will be spliced into each end of the barrel connector.
4. Crimp each end of the barrel using a dimple-type crimp tool DK10CHA17003-3 or a similar tool, to secure the wires. See [Fig. 16](#).



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Fig. 16, Crimping With DK10CHA17003-3 or Similar Tool

5. Pull test the wires by hand to ensure the crimp is mechanically solid.
6. Slide the shrinkable solder sleeve onto the barrel connector, so the solder band is at the center of the barrel connector.
7. Heat the splice using a heat gun rated at 250°F (121°C), as shown in [Fig. 17](#), until the sleeve has completely shrunk against the wire and the solder flows into the barrel connector. A small fillet of adhesive may be visible at the ends of the connector. See [Fig. 18](#).

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Fig. 17, Heating the Solder Sleeve

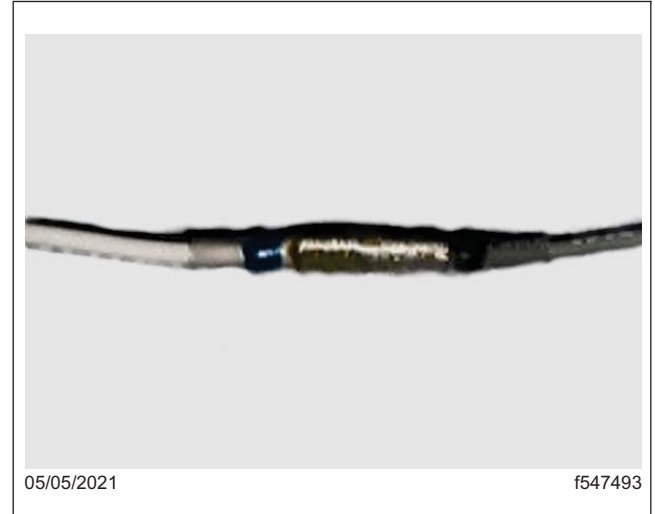


Fig. 18, Correctly Heated Solder Sleeve

- Slide the shrinkable tubing over the splice and apply heat with a heat gun rated at 250°F (121°C), as shown in [Fig. 19](#), until it has completely shrunk against the wire insulation, as shown in [Fig. 20](#). A small fillet of adhesive should be visible at the ends of the shrinkable tubing. See [Fig. 21](#).

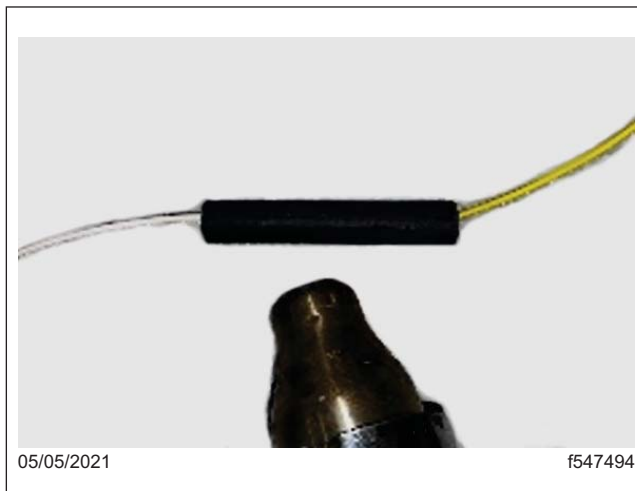


Fig. 19, Heating the Tube Sleeve



Fig. 20, Sealed Tube Sleeve



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Fig. 21, Tube Sleeve with Adhesive

Wiring Repair Using Phillips STA-DRY® Crimp and Solder Connectors

1. Prepare the wires to be spliced by stripping the insulation to expose 1/4 inch of copper. See [Fig. 22](#). Slide a 3-inch section of adhesive coated shrink tubing onto one of the wires.



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Fig. 22, Sta-DRY Connector, Prepared Wires, and Crimping Tool

2. Crimp the splice connector onto the wires. Use a dimple-type crimp tool DK10CHA17003-3 or a similar tool to crimp the connector, as shown in [Fig. 23](#). The dimple must be at least 3/16 inch wide or there will be too much space inside the connector and the solder will not flow into the wire. This crimp provides the mechanical retention needed.

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Fig. 23, Crimping With DK10CHA17003-3 or a Similar Tool

3. Pull test the wires by hand to ensure the crimp is mechanically solid.

NOTE: A crimp tool that is too narrow will leave excessive air gaps in the crimp. The connection will not have the required amount of mechanical strength and the solder will not bond the wire to the connector.

4. Heat the properly crimped splice connector with a heat gun rated at 250°F (121°C) while slowly rotating the wire. The solder will take longer to flow than it will for the shrinkable insulation to contract. Heat until the solder band has completely melted into the connector. See [Fig. 24](#). If the shrinkable insulation ruptures and a small amount of solder bubbles out, gently shake the splice to remove the solder.



Fig. 24, Sealed Splice Connector

- When the connector has cooled, center the shrinkable tubing over the splice and heat the tubing, as shown in [Fig. 25](#), until it has completely sealed the splice and a small fillet of adhesive is visible at the ends of the shrink tube. See [Fig. 26](#).

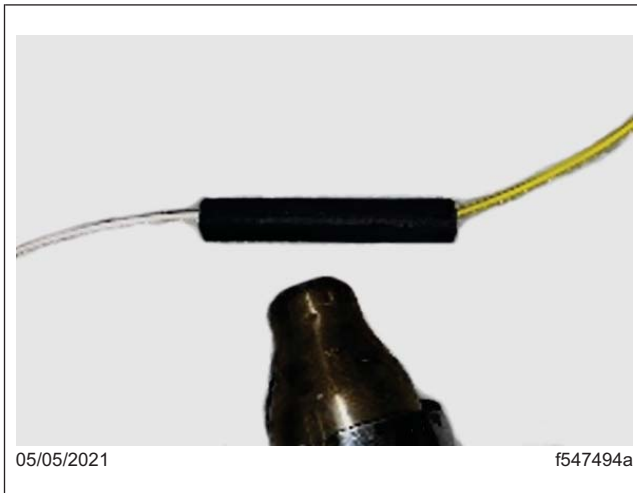


Fig. 25, Heating the Tube Sleeve

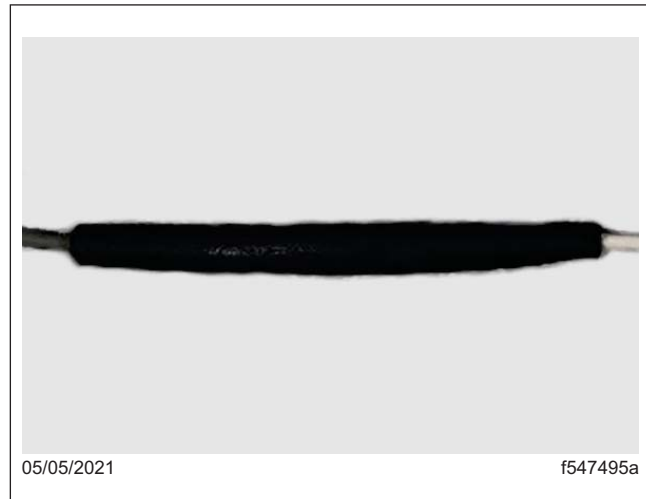


Fig. 26, Sealed Tube Sleeve

Cavity Plug Seals

To ensure that no moisture or debris enters the connector, all empty cavities (cavities that do not contain a sealed wire) must be plugged. Use cavity plugs to fill all empty cavities. See [Table 3](#) for a list of cavity seal part numbers.

Cavity Plug Seals			
Location	Cavity Position	Plug Size	Part Number
Chassis	1–94	1.2S–small	23-13218-070
	98–102	1.5S, 2.5S–medium	23-13218-100
	95, 96, 103, 104	2.8S–large	23-13218-102

Table 3, Cavity Plug Seals

Warranty

This is an informational bulletin only. Warranty does not apply.