

ELECTRICAL SYSTEM**Wiring - General Information (Sedan)****WIRING****GENERAL INFORMATION****ANTENNA WIRES, REPAIRING**

A repair procedure has been developed for repairing antenna wires. Instead of a complete antenna wire, connecting wires of different lengths and various adapter leads are now available as replacement parts.

NOTE:

- Do not repair antenna wires. Replace them using connector and adapter wires available as original replacement parts.
- These original replacement parts are suitable for all antenna wires and wire cross sections that need to be replaced.
- Individual antenna connectors are not designed to be replaced.
- The wires must be used retroactively for all Audi models, for all installed antenna wire diameters.
- All adapter leads and connecting wires are suitable for various transmission and reception signals.
- The repair concept can also be used as a testing or retrofitting solution.

Special tools and workshop equipment required

-1- Adapter wire, for connection to radio; length: approximately 30 cm

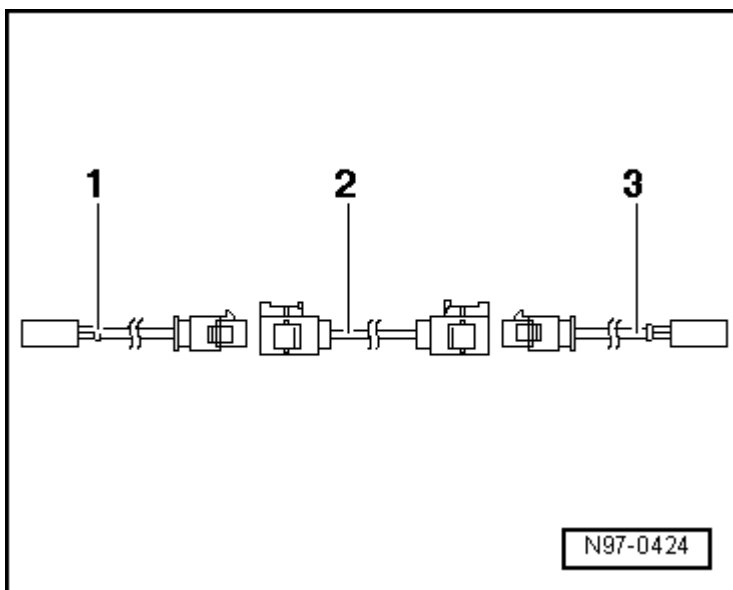


Fig. 1: Assembly Overview Of Antenna Wire

Courtesy of AUDI OF AMERICA, LLC

-2- Connecting wire, available in various lengths

-3- Adapter wire, for connection to antenna; length: approximately 30 cm

Procedure

Example: Antenna wire from radio to antenna is faulty.

-- Separate the connectors of the faulty antenna wiring from their components.

-- Determine the path of the faulty antenna wire in the vehicle and measure the total length of antenna wire to be replaced.

- The entire length of the antenna wire consists of the length of the required adapter wires -1 and 3- and the connecting wire -2-.

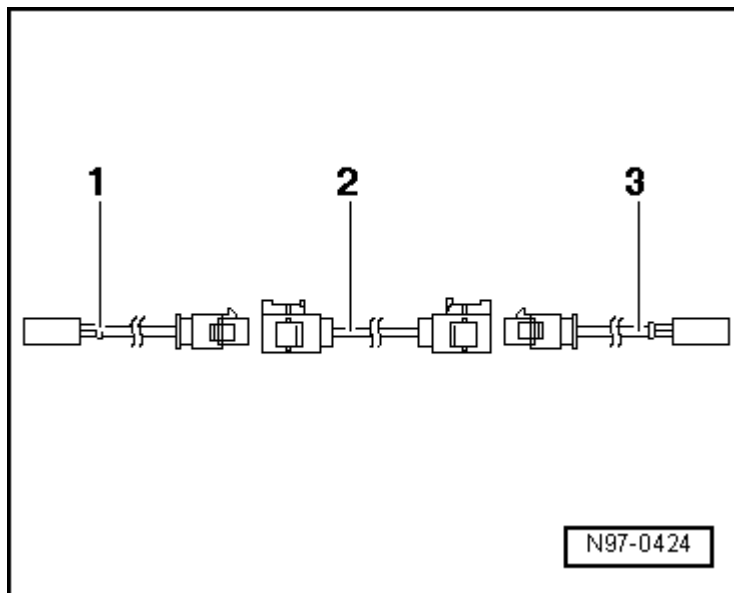


Fig. 2: Assembly Overview Of Antenna Wire
Courtesy of AUDI OF AMERICA, LLC

-- Subtract 60 cm from the total length of antenna wire measured, to receive the length of connecting wire required.

-- Obtain the correct length of the required adapter wires and connecting wires as an original replacement part.

-- Cut the connectors off of the faulty antenna wiring.

- Leave the rest of the defective antenna wire in the vehicle.

-- Connect the adapter wires to the devices in the vehicle.

-- Provide harness connectors with piece of foam hose to avoid rattle.

-- Route and secure connecting wire parallel to old antenna wire.

NOTE: **Antenna wires must not be kinked or excessively bent! The bending radius must never be below 50 mm.**

-- Connect the connecting wire with the adapter leads.

-- To avoid rattle, slide a suitable piece of foam hose onto antenna connector.

-- Perform a function test.

FIBER OPTIC CABLE

DETERMINE LOCATION OF PROBLEM

Special tools and workshop equipment required

- Vehicle Diagnostic Tester

Procedure

It is very difficult to find the exact location of the problem. Replace the damaged fiber-optic cable and lay a new wire parallel to the defective fiber-optic cable.

- NOTE:**
- **Select the damaged fiber-optic cable components with the "Guided Fault Finding" or "Guided Functions" from the vehicle diagnostic tester menu options.**
 - **A fiber-optic cable that needs repair is represented by a "yellow" color.**

-- Connect the vehicle diagnostic tester and turn on the ignition.

-- Select the following menu items:

- **Guided Functions or Guided Functions**
- **GO TO**
- **Select Function/Component Selection**
- **Body**
- **Electrical Equipment**
- **01 - OBD capable systems**
- **Ring Break Diagnosis**

-- Remove the affected components.

-- Disconnect the connector from the components.

-- Assemble the fiber-optic cable:

- Refer to **ASSEMBLE FIBER-OPTIC CABLE WITH FIBER-OPTIC CABLE REPAIR KIT VAS 6223**
- Refer to **ASSEMBLE FIBER-OPTIC CABLE WITH FIBER-OPTIC CABLE REPAIR KIT VAS 6223A**

ASSEMBLE FIBER-OPTIC CABLE WITH FIBER-OPTIC CABLE REPAIR KIT VAS 6223

Special tools and workshop equipment required

- Fiber Optic Pliers Repair Set VAS 6223
- Air Hose Pliers VAS 6228

CAUTION: Danger of causing damage to the fiber-optic cable.

- Do not bend the fiber-optic cable too much. Do not exceed a bending radius of 25 mm (1 in.).
- Fiber optic cables must not be routed over sharp edges.
- The fiber-optic cable must not be dirty or touched with bare fingers.
- Fiber optic cables may not be heated.
- It is not permitted to twist together 2 fiber optic cables or one fiber optic cable with a copper wire.
- Protect the connector and the connection box from dust. Place the cap on the trunk.

Checking Remaining Cut Indicator

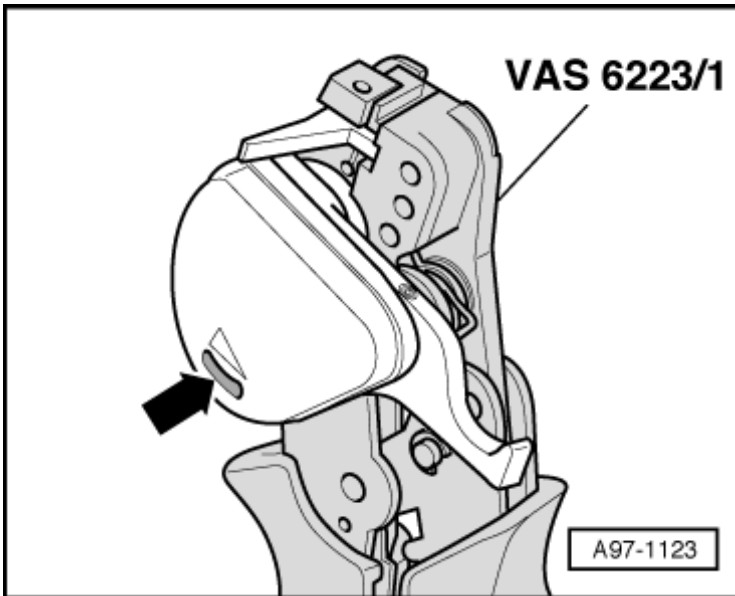


Fig. 3: Pliers For Fiber-Optic Conductor VAS 6223/1 Cutting Device
Courtesy of AUDI OF AMERICA, LLC

-- Start by checking remaining cut indicator:

- The VAS 6223/1 cutting device can perform approximately 1260 cuts. The blade is rotated for each additional cut.
- The last remaining 150 cuts are indicated via the remaining cut display -arrow-.
- Once no further cuts are available, the blade is blocked. It must be replaced. Refer to the Operating Instructions that come with VAS 6223/1.

Preparing Pliers For Fiber-Optic Conductor VAS 6223/1

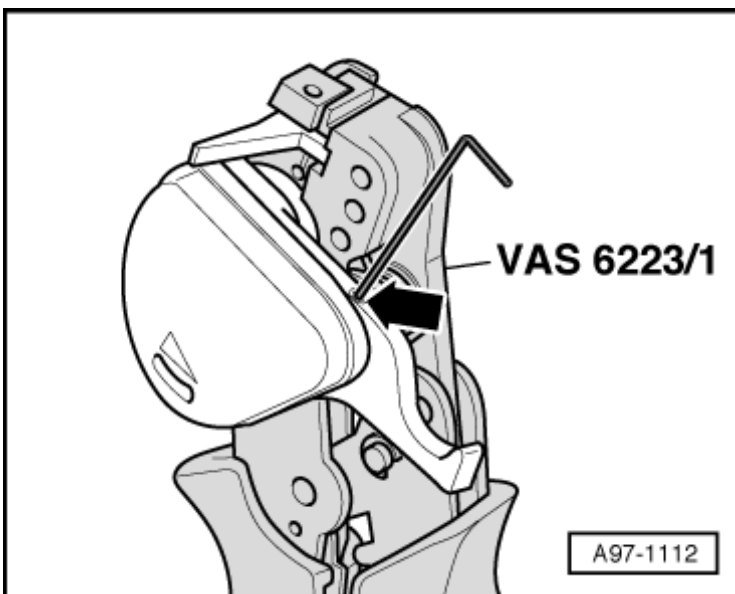


Fig. 4: Locating Transportation Safeguard At Cutter

Courtesy of AUDI OF AMERICA, LLC

-- Release transport safety device on cutter by loosening hex socket bolt -arrow-.

Fiber Optic Cable, Cutting To Length

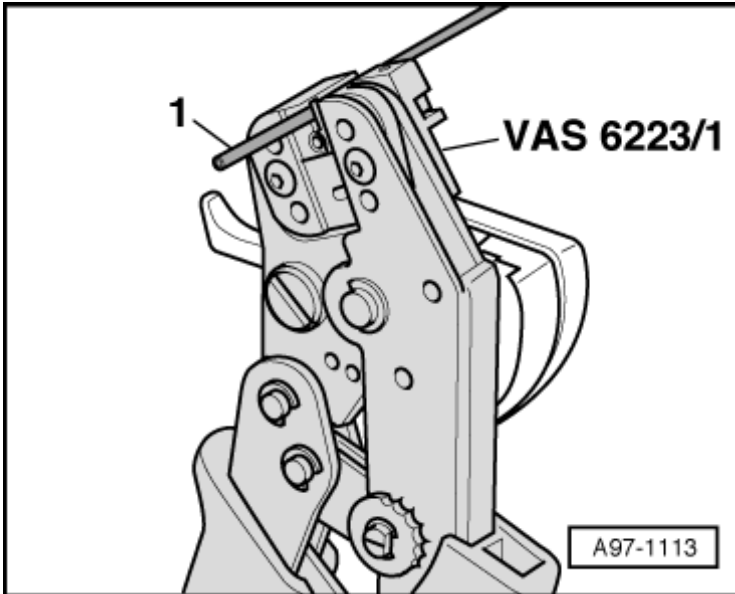


Fig. 5: Fiber Optic Cable, Cutting To Length
Courtesy of AUDI OF AMERICA, LLC

- Establish length of fiber optic cable required.
- Open VAS 6223/1 and insert fiber-optic cable -1- into trimming station.
- Close cutting tool to cut fiber optic cable to length.

Stripping

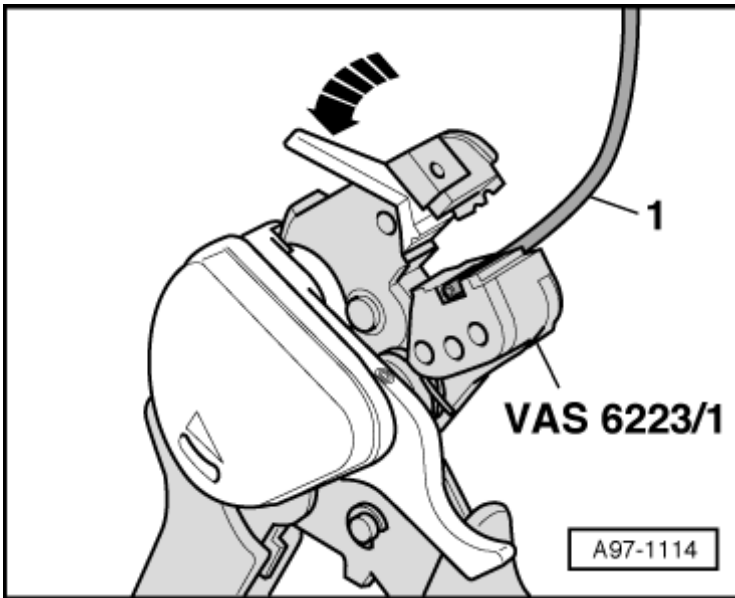


Fig. 6: Opening Pliers For Fiber Optic Conductor VAS 6223/1
Courtesy of AUDI OF AMERICA, LLC

-- Open VAS 6223/1.

- Stripping lever must be located in the lower position -arrow-.

-- Insert fiber-optic cable -1- into stripping station.

- Fiber-optic cable must terminate flush to rear side of cutting pliers.

-- Close VAS 6223/1 until stop and keep closed.

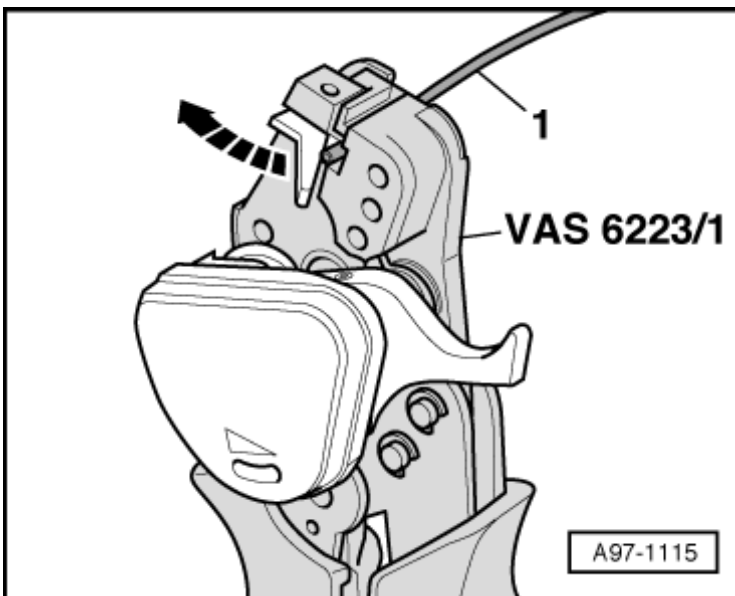


Fig. 7: Closing Pliers For Fiber Optic Conductor VAS 6223/1 Until Stop And Keep Closed

Courtesy of AUDI OF AMERICA, LLC

- Pivot stripping lever upward -arrow-.
- Open cutting pliers and remove fiber-optic cable -1-.
- Detach separated section of insulation from fiber-optic cable.

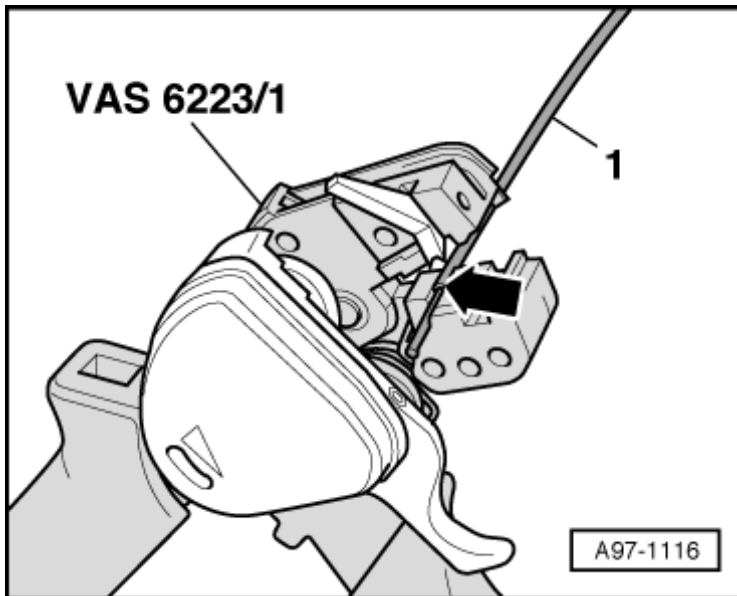
Precision Cutting (Production Of Optical End Face)

Fig. 8: Sliding Fiber Optic Cable Into Cutting Point
Courtesy of AUDI OF AMERICA, LLC

- Slide fiber-optic cable -1- into cutting station.
 - Insulation must make contact at stop -arrow- of cutting station.
- Close VAS 6223/1.
- Press down -arrow- cutting device.

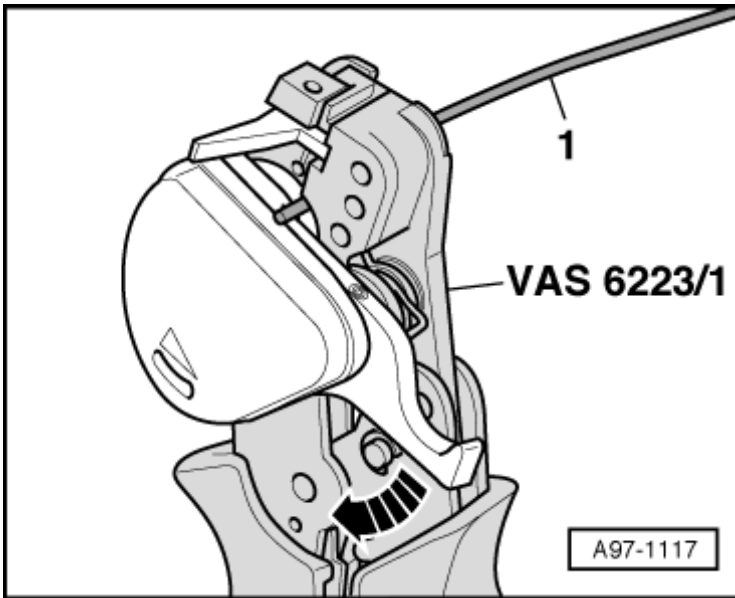


Fig. 9: Pressing Cutting Unit Down

Courtesy of AUDI OF AMERICA, LLC

-- Open VAS 6223/1 and remove fiber-optic cable -1-.

NOTE: Fiber-optic cable is only to be placed on an absolutely clean surface.

Activating Transportation Safeguard

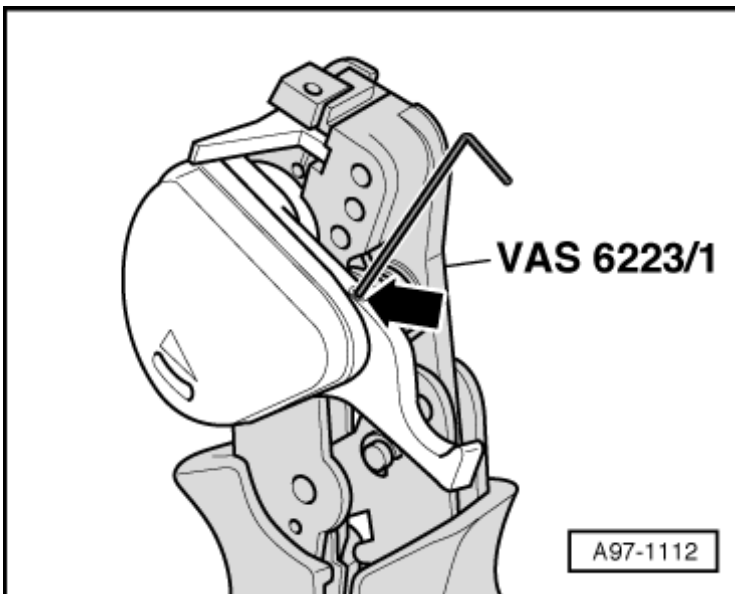


Fig. 10: Locating Transportation Safeguard At Cutter

Courtesy of AUDI OF AMERICA, LLC

-- Close VAS 6223/1.

-- Tighten hex socket bolt -arrow- for transport safety device on cutter.

Attaching Brass Pin Contact To Fiber-Optic Cable

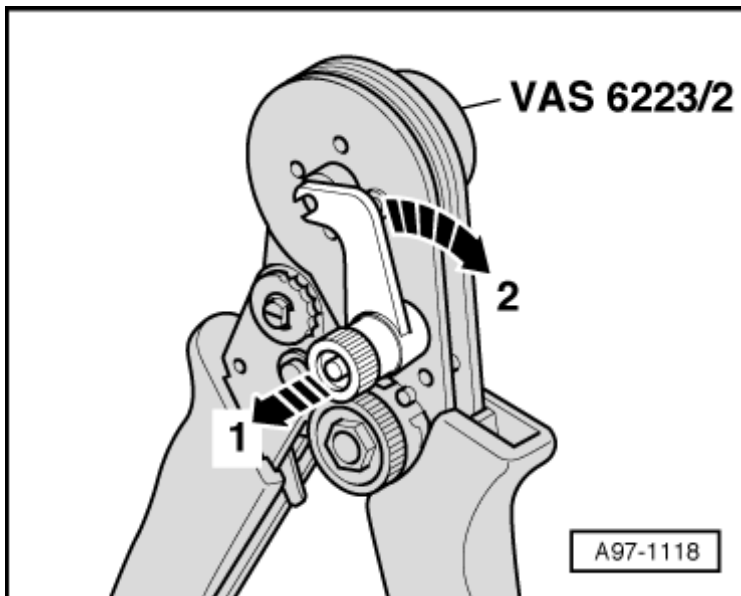


Fig. 11: Opening Securing Lever On Crimping Pliers For Fiber-Optic Cable VAS 6223/2
Courtesy of AUDI OF AMERICA, LLC

-- Open securing lever on VAS 6223/2 -arrow 1- and -arrow 2-.

-- Insert a brass pin contact -1- into mount.

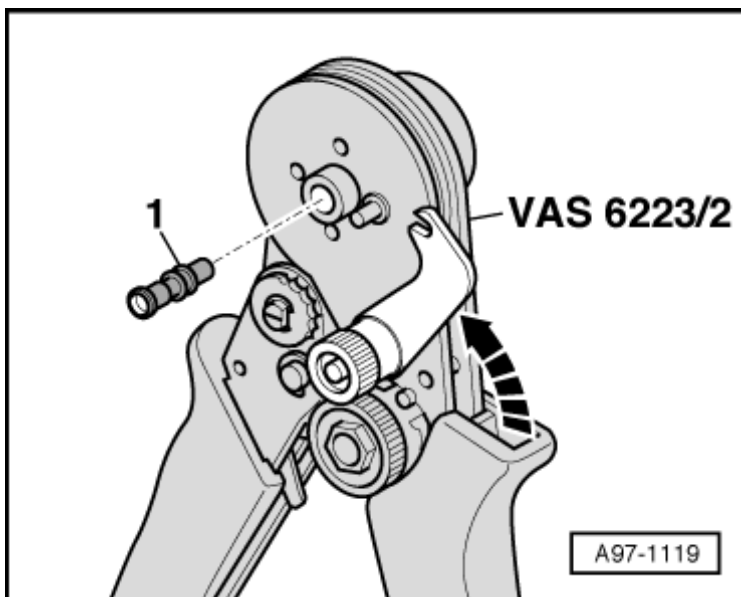


Fig. 12: Closing Securing Lever On Crimping Pliers For Fiber-Optic Cable VAS 6223/2
Courtesy of AUDI OF AMERICA, LLC

- Close securing lever on VAS 6223/2 -arrow-.
- Slide fiber-optic cable -2- in brass pin contact -1- up to spring-loaded stop.

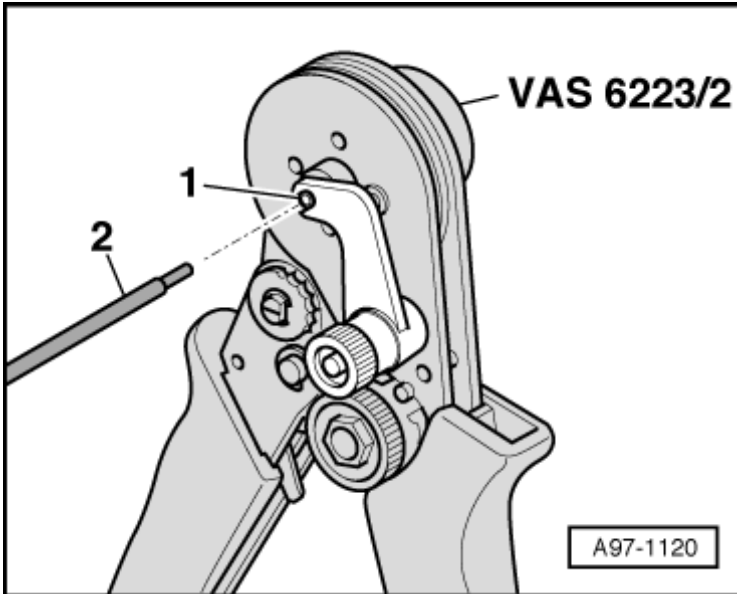


Fig. 13: Sliding Fiber Optic Cable Into Brass Pin Contact As Far As Spring-Loaded Stop
Courtesy of AUDI OF AMERICA, LLC

- Slide fiber-optic cable further in up to fixed stop and close VAS 6223/2.
- Open crimping pliers for fiber-optic cable and remove fiber-optic cable with brass pin contact.

CAUTION: Do not bend the fiber-optic cable too much. Do not exceed a bending radius of 25 mm (1 in.).

- Check the connection of brass pin contact -2- to fiber-optic cable -1- for secure installation.

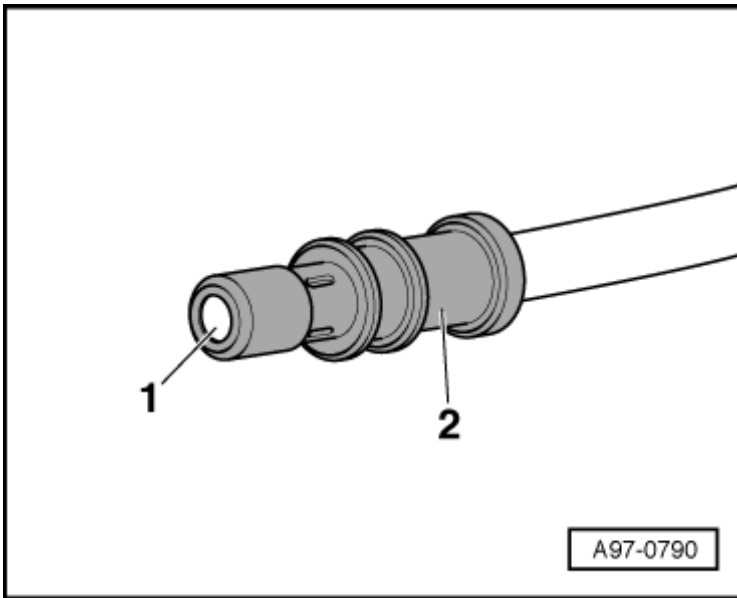


Fig. 14: Checking Proper Attachment Of Brass Pin Contact To Fiber Optic Cable
Courtesy of AUDI OF AMERICA, LLC

- 4 crimp points must be visible at brass connection pin.
- The brass pin contact must not be able to be removed by hand from fiber-optic cable.
- The end face of the fiber-optic cable is located 0.01 to 0.1 mm behind the brass pin contact (visual inspection).

NOTE:

- Connector couplings are available for connecting fiber-optic cables.
- Installing a new fiber-optic cable in a wiring harness connector, refer to **DISCONNECTING FROM WIRING HARNESS CONNECTOR.**

Installing Corrugated Tube On Fiber-Optic Cable

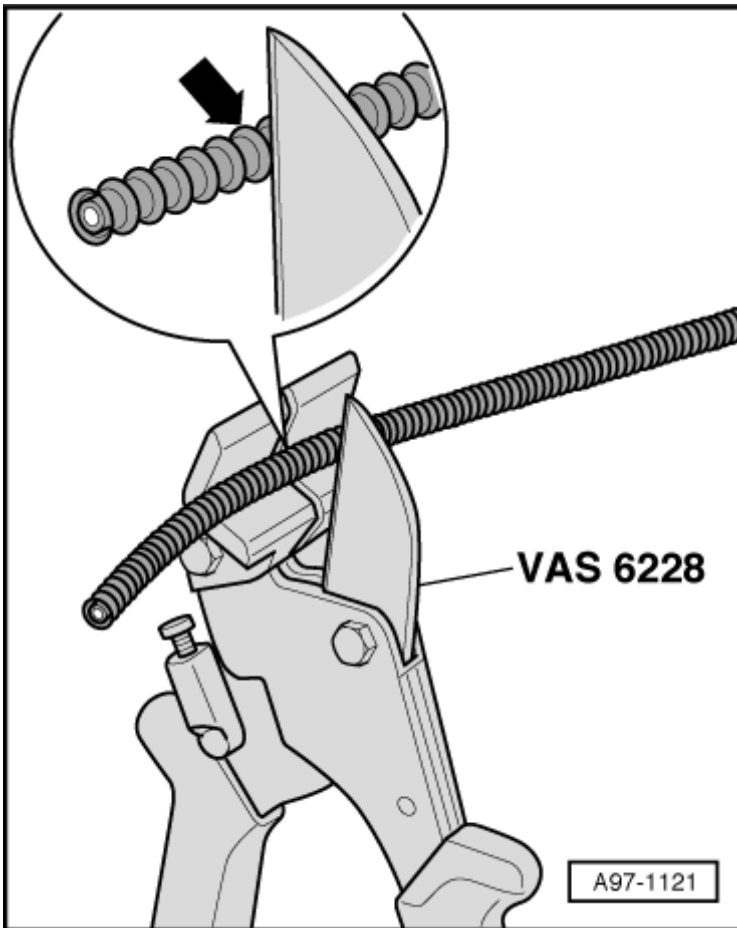


Fig. 15: Cutting Corrugated Tube To Appropriate Length Using Air Hose Pliers VAS 6228 Or A Sharp Knife

Courtesy of AUDI OF AMERICA, LLC

-- Cut the corrugated tube to the appropriate length.

- Use VAS 6228 or a sharp knife for cutting.
- The corrugated tube must not be cut through using a side cutter under any circumstances
- The corrugated tube must be cut on the wave peak -arrow-, not in the wave trough.

-- Guide fiber-optic cable into VAS 6223/10 as shown in illustration.

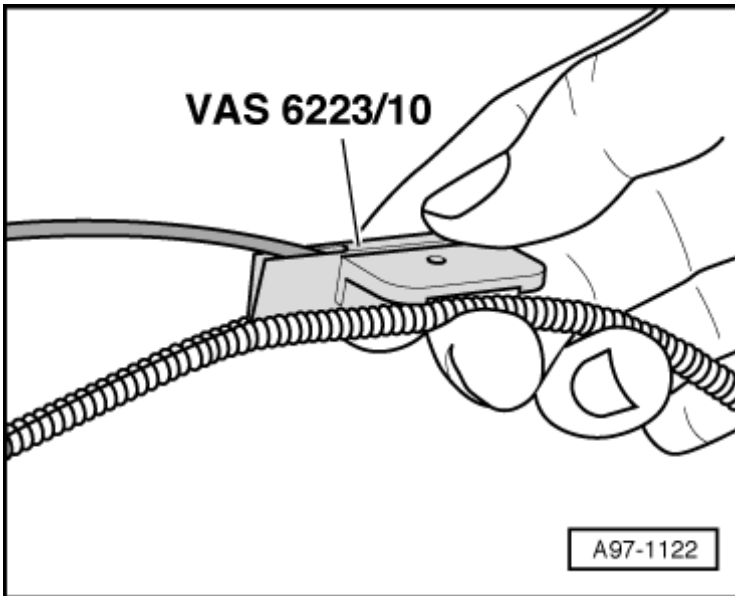


Fig. 16: Guiding Fiber-Optic Cable Into Corrugated Tube With VAS 6223/10
Courtesy of AUDI OF AMERICA, LLC

-- Position crimping pliers for fiber-optic cable at slot of corrugated tube.

-- Position crimping pliers for fiber-optic cable at slot of corrugated tube. By doing this, fiber-optic cable is fed in corrugated tube.

ASSEMBLE FIBER-OPTIC CABLE WITH FIBER-OPTIC CABLE REPAIR KIT VAS 6223A

Special tools and workshop equipment required

- Fiber Optic Pliers Repair Set VAS 6223A
- Air Hose Pliers VAS 6228

CAUTION: Danger of causing damage to the fiber-optic cable.

- Do not bend the fiber-optic cable too much. Do not exceed a bending radius of 25 mm (1 in.).
- Fiber optic cables must not be routed over sharp edges.
- The fiber-optic cable must not be dirty or touched with bare fingers.
- Fiber optic cables may not be heated.
- It is not permitted to twist together 2 fiber optic cables or one fiber optic cable with a copper wire.
- Protect the connector and the connection box from dust. Place the cap on the trunk.

Install the tool set for the fiber-optic cable pliers VAS 6223/1.

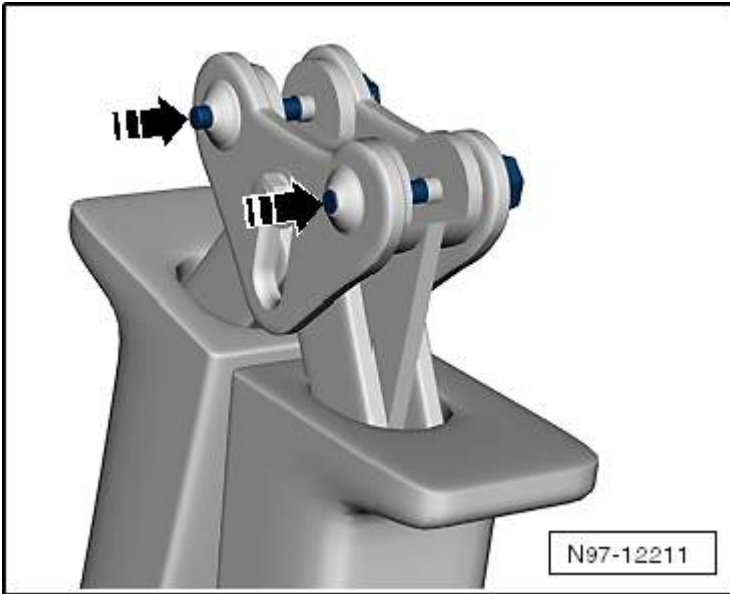


Fig. 17: Identifying Locking Pins
 Courtesy of AUDI OF AMERICA, LLC

- Remove the locking pins -arrows-.
- Mount the tool head -arrow- and push back the locking pins.

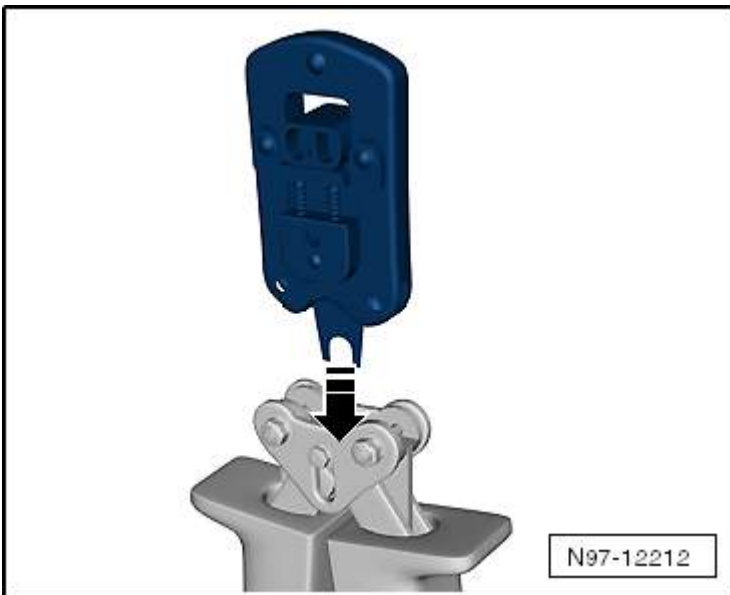


Fig. 18: Identifying Tool Set
 Courtesy of AUDI OF AMERICA, LLC

Fiber optic cable, cutting to length

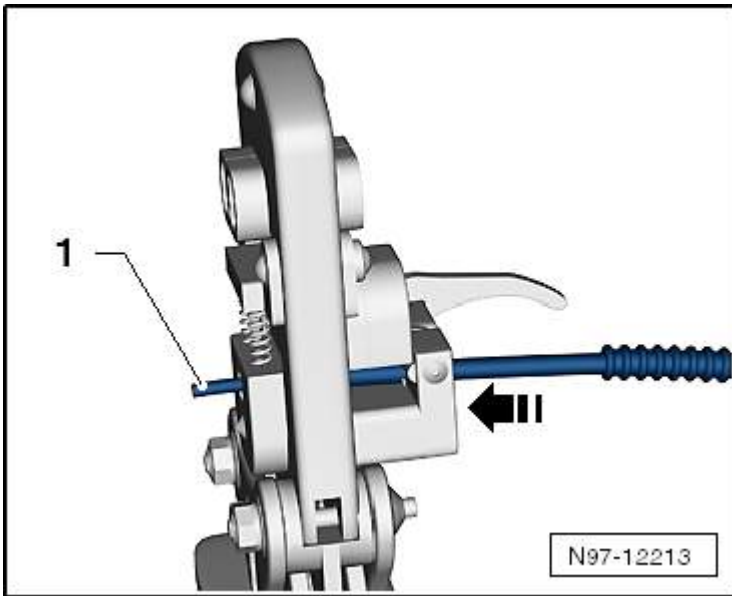


Fig. 19: Identifying Method To Cut Fiber Optic Cable To Length
Courtesy of AUDI OF AMERICA, LLC

- Establish length of fiber optic cable required.
- Open the VAS 6223/1 and lay the fiber-optic cables -1- in the mount.
- Close the fiber-optic cable pliers to cut the fiber-optic cable lengths.

Stripping

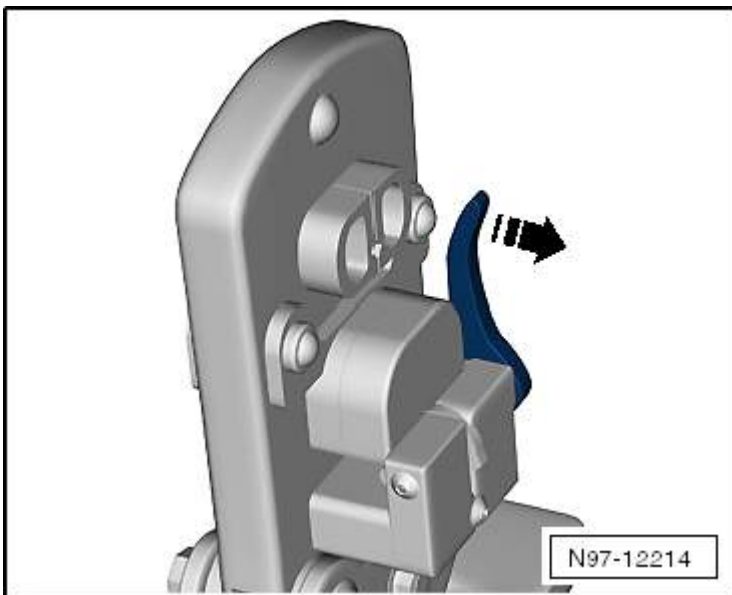


Fig. 20: Identifying Open Position For VAS 6223/1
Courtesy of AUDI OF AMERICA, LLC

- Open the VAS 6223/1.
- Position the wire stripper in the lower position -arrow-.
- Insert fiber-optic cable into the stripping station.
 - Fiber-optic cable must terminate flush to rear side of cutting pliers.
- Close Pliers For Fibre-optic Conductor until stop and keep closed.
- Bend the wire stripper upward -arrow- and remove the fiber-optic cable.

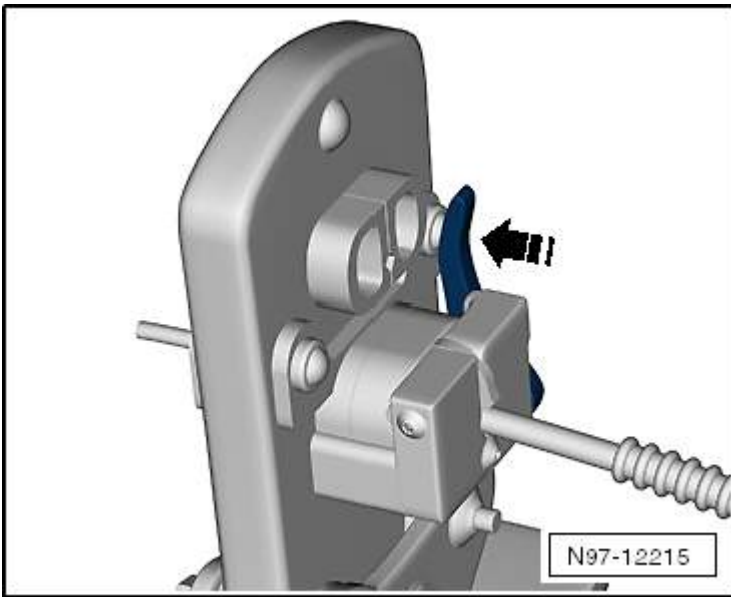


Fig. 21: Identifying Closed Position For VAS 6223/1
Courtesy of AUDI OF AMERICA, LLC

Precision cutting (production of optical end face)

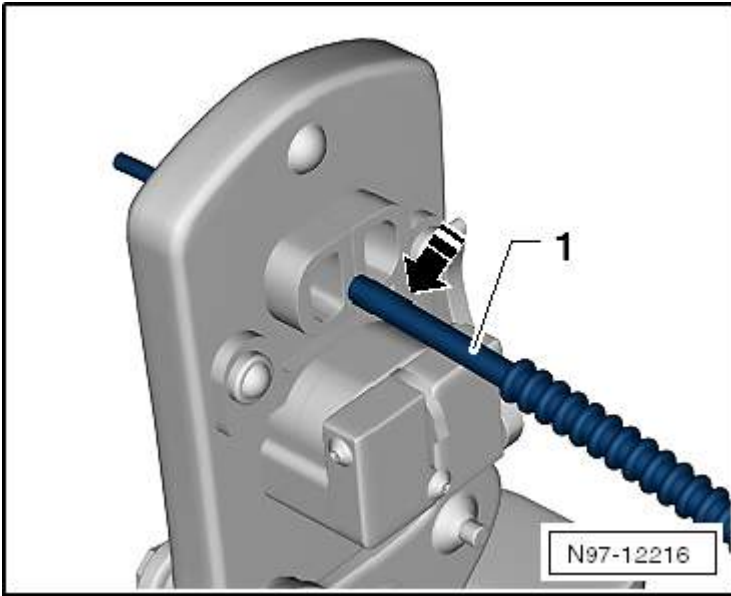


Fig. 22: Identifying Position Of Fiber-Optic Cable In Cutting Position
Courtesy of AUDI OF AMERICA, LLC

-- Push the fiber-optic cable -1- into the cutting station.

- Insulation must make contact with cutting point stop.

-- Close the VAS 6223/1 and remove the wire.

-- Visually inspect the wire -1- to make sure that it was cut correctly and that there are no burrs on the front surface.

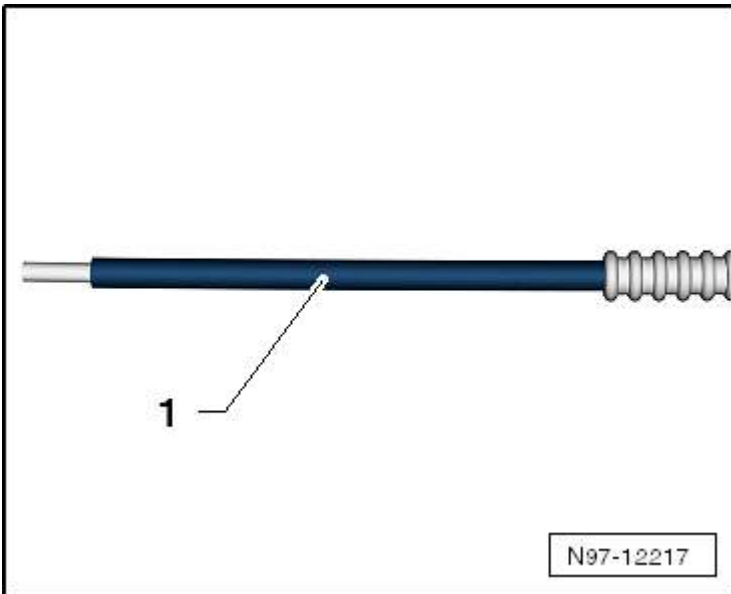


Fig. 23: Identifying Visual Inspection Of Cut Wire
Courtesy of AUDI OF AMERICA, LLC

NOTE:

- Fiber-optic cable is only to be placed on an absolutely clean surface or held in hand.
- Use the cap if there is a risk of the fiber-optic cable surface becoming dirty.

Attaching brass pin contact to fiber-optic cable.

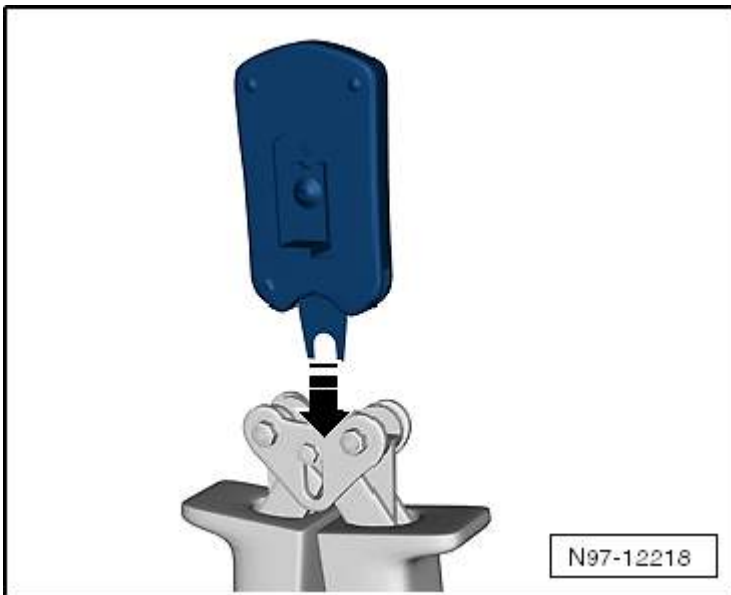


Fig. 24: Identifying Change Of Tool Head
Courtesy of AUDI OF AMERICA, LLC

-- Change tool head -arrow-.

-- Push the lock on the VAS 6223/1 -arrow- so that "Stift" (pin) is visible.

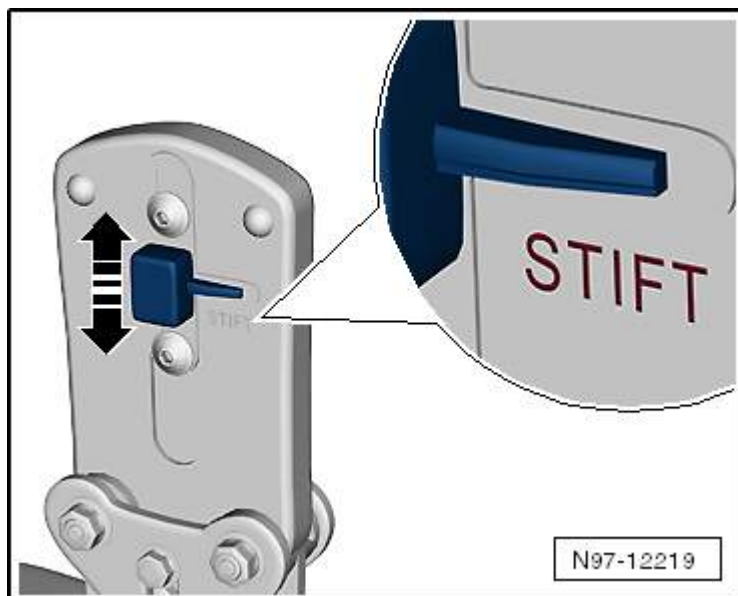


Fig. 25: Identifying Movement Of Fuse On VAS 6223/1 To Show "Stift"
 Courtesy of AUDI OF AMERICA, LLC

-- Insert a brass pin contact -1- in the mount.

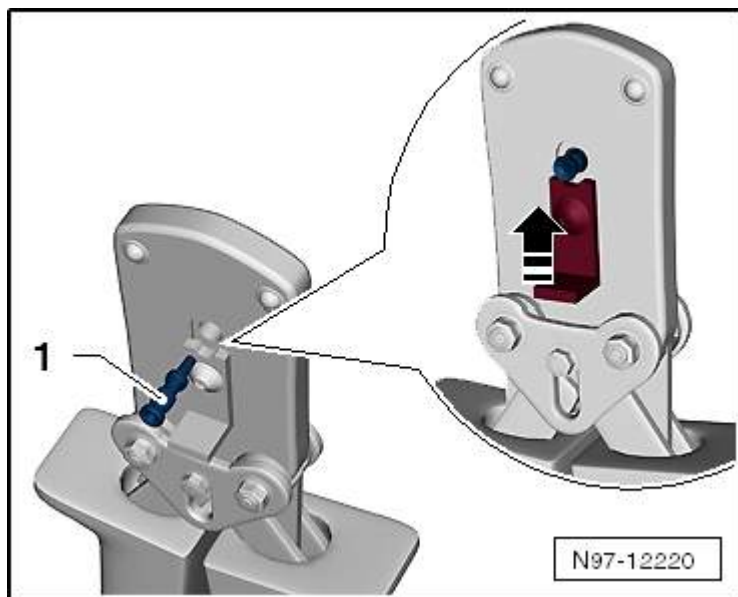


Fig. 26: Identifying Inserted Brass Pin And Securing Lever
 Courtesy of AUDI OF AMERICA, LLC

-- Close the securing lever on the VAS 6223/1 -arrow-.

-- Insert the fiber-optic cable into the brass pin contact -arrow- all the way up to the threaded stop and then close the VAS 6223/1.

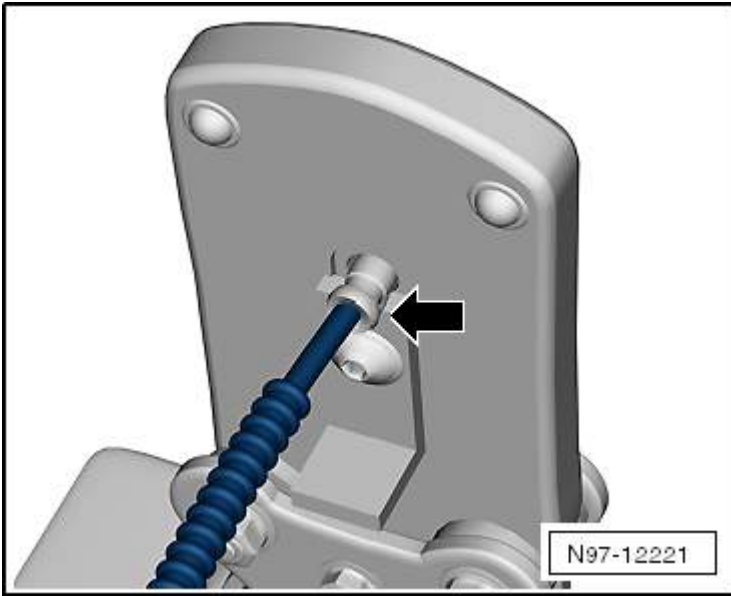


Fig. 27: Identifying Inserted Fiber Optic Cable
Courtesy of AUDI OF AMERICA, LLC

-- Open the fiber-optic cable pliers and remove the fiber-optic cable along with the brass contact pin.

CAUTION: Do not bend the fiber-optic cable too much. Do not exceed a bending radius of 25 mm.

-- Make sure that the brass contact pin -2- is secured on the fiber-optic cable -1-.

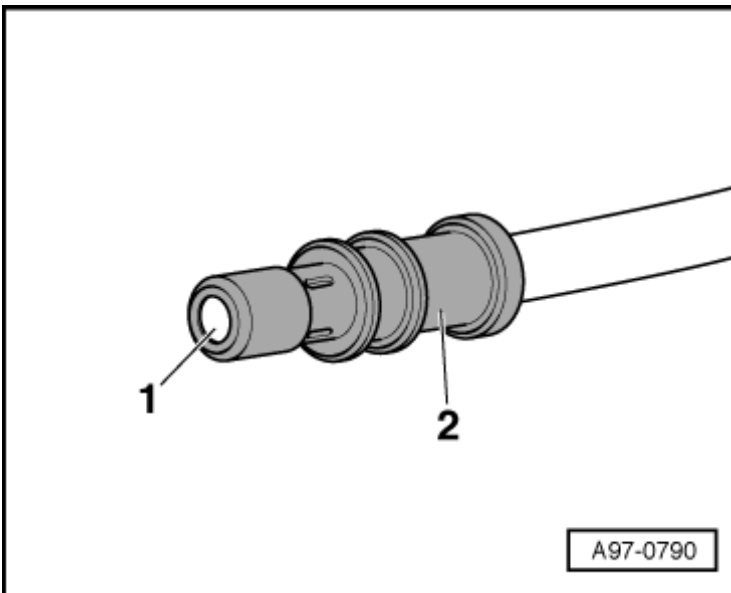


Fig. 28: Checking Proper Attachment Of Brass Pin Contact To Fiber Optic Cable
Courtesy of AUDI OF AMERICA, LLC

- 4 crimped points must be visible on the brass connecting pin.
- The brass pin contact must not be able to be removed by hand from fiber-optic cable.
- The end face of the fiber-optic cable is located 0.01 to 0.1 mm behind the brass pin contact (visual inspection).

NOTE:

- Connector couplings are available for connecting fiber-optic cables.
- For installing new fiber optic cable in wiring harness connector, refer to **DISCONNECTING FROM WIRING HARNESS CONNECTOR**.

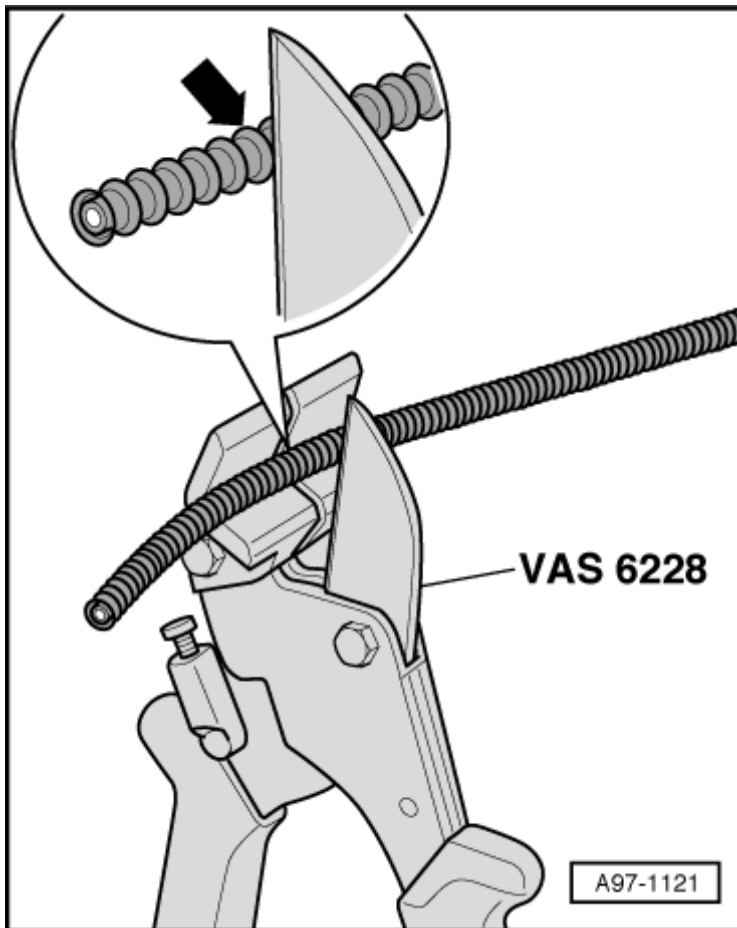
Installing corrugated tube on fiber-optic cable

Fig. 29: Cutting Corrugated Tube To Appropriate Length Using Air Hose Pliers VAS 6228 Or A Sharp Knife

Courtesy of AUDI OF AMERICA, LLC

-- Cut corrugated tube to appropriate length.

- Use air hose pliers VAS 6228 or a sharp knife for cutting.
- The corrugated tube must not be cut through using a side cutter under any circumstances

- The corrugated tube must be cut on the wave peak -arrow-, not in the wave trough.
- The corrugated tube must audibly engage in the fiber-optic cable housing when installing.

-- Insert the fiber-optic cable into the pliers for corrugated tube installation VAS 6223/10, as illustrated.

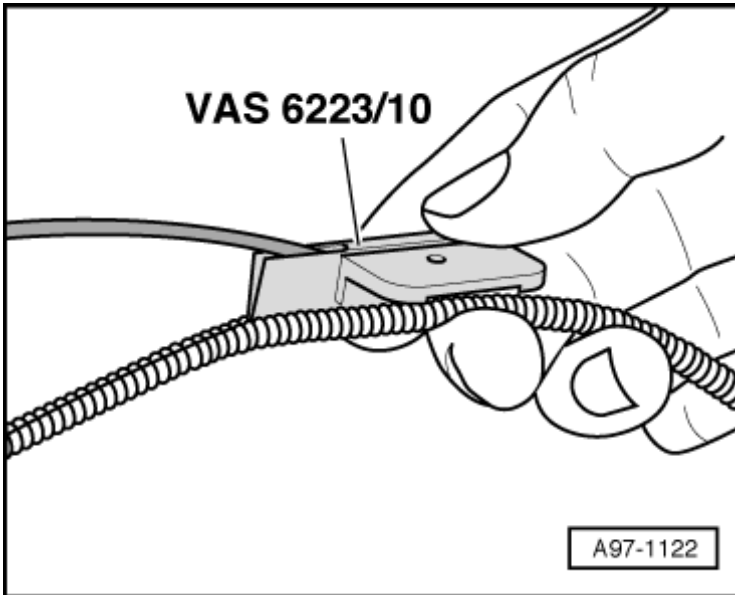


Fig. 30: Guiding Fiber-Optic Cable Into Corrugated Tube With VAS 6223/10
Courtesy of AUDI OF AMERICA, LLC

-- Position corrugated tube assembly pliers on slot on the tube.

-- Position crimping pliers for fiber-optic cable at slot of corrugated tube. By doing this, fiber-optic cable is fed in corrugated tube.

DISCONNECTING FROM WIRING HARNESS CONNECTOR

CAUTION: Do not excessively bend or kink fiber optic cables. (minimum bending radius 25 mm).

Removal

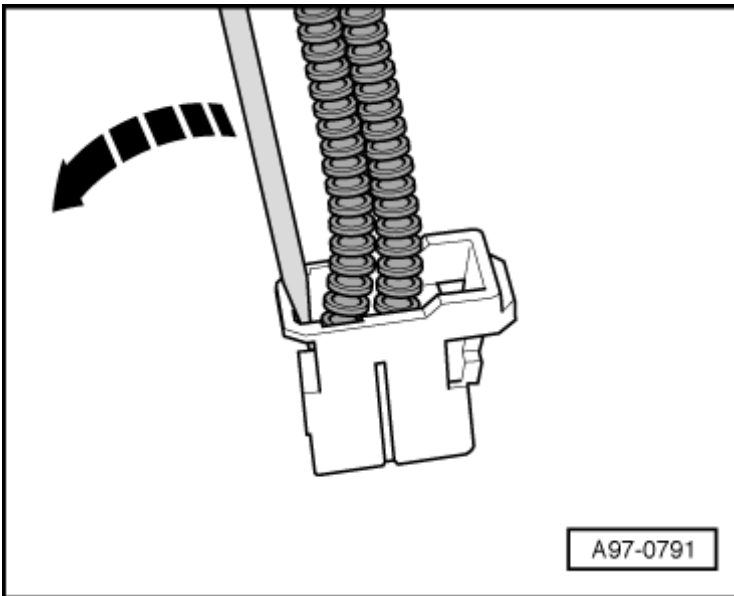


Fig. 31: Releasing Catch In Fiber Optic Cable Connector Using Small Screw Driver
Courtesy of AUDI OF AMERICA, LLC

- Unplug connector for fiber optic cable from appropriate control unit.
- Release locking latch in fiber-optic cable connector -arrow-.
- Pull base module -2- for fiber-optic cable from connector housing -1-.

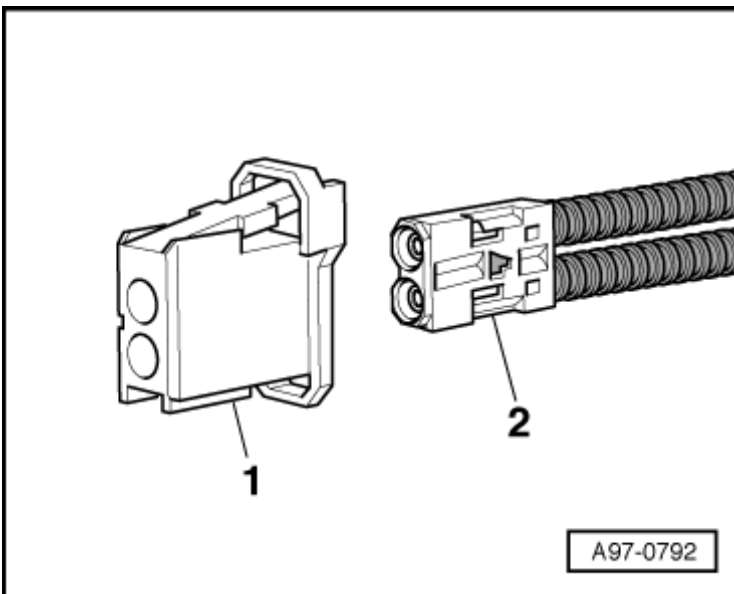


Fig. 32: Pulling Fiber Optic Cable Basic Module Out Of Connector Housing
Courtesy of AUDI OF AMERICA, LLC

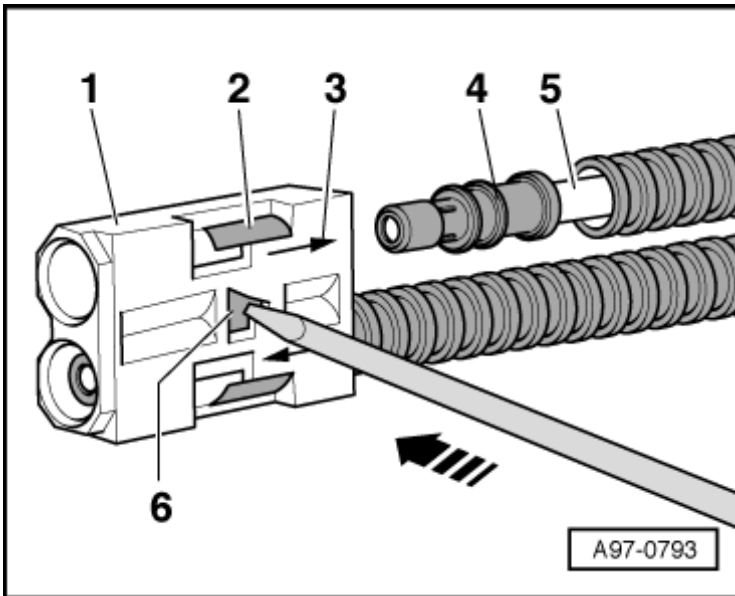


Fig. 33: Making Colored Dots To Mark Assignment Of Fiber Optic Cable To Corresponding Sockets In Basic Module

Courtesy of AUDI OF AMERICA, LLC

CAUTION:

- Mark allocation of fiber-optic cable -5- to the appropriate connector socket in base module -1- with color marking.
- Note the arrows -3- for allocation on the base module "IN" and "OUT".

-- Release secondary latch -6- (blue pin) using a small screwdriver -arrow-.

-- Release catch -2- and remove fiber-optic cable -5- with brass connector pin -4- from base module -1-.

Installation

Install in reverse order of removal. Note the following:

-- Install fiber optic cable in line with markings.

NOTE:

Seal open harness connector -2- for fiber-optic cable using Protective Cap For Cable Connector VAS 6223/9 -item 1-.

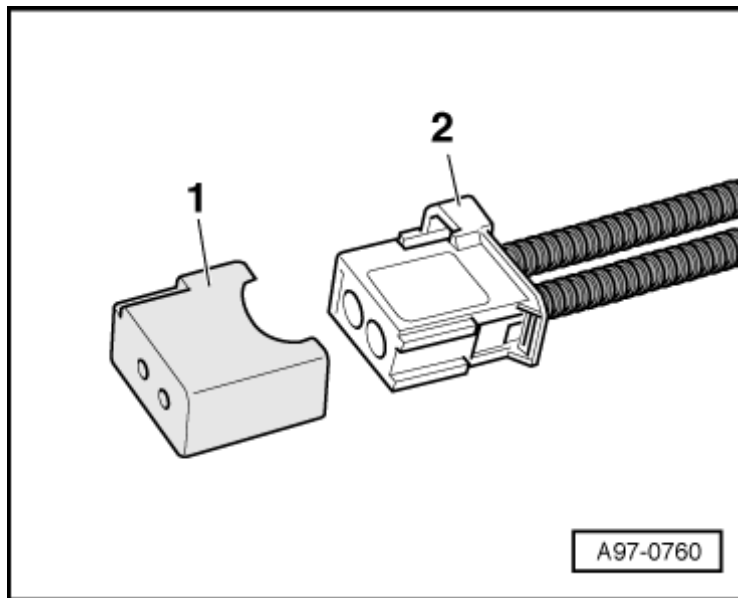


Fig. 34: Fiber-Optic Cable Harness Connector And Protective Cap For Cable Connector VAS 6223/9

Courtesy of AUDI OF AMERICA, LLC

Protective cap prevents contamination of or mechanical damage to end face of fiber optic cable which would impair signal transmission.

-- Install fiber optic cable in line with markings.

CONNECTOR HOUSINGS AND CONNECTORS, REPAIRING

CONNECTOR HOUSINGS AND CONNECTORS, REPAIR INFORMATION

NOTE:

- Observe general notes for repairs to the vehicle electrical system. Refer to **GENERAL NOTES ON REPAIRS ON VEHICLE ELECTRICAL SYSTEM.**
- Allocation of crimp contacts with correct fit to connector housing is performed according to the part number stamped in on the connector housing. Connector housing part numbers in conjunction with the appropriate crimp contacts.
- Damaged connector housings must always be replaced.

CONTACTS IN CONNECTOR HOUSING, REPAIRING

Procedure

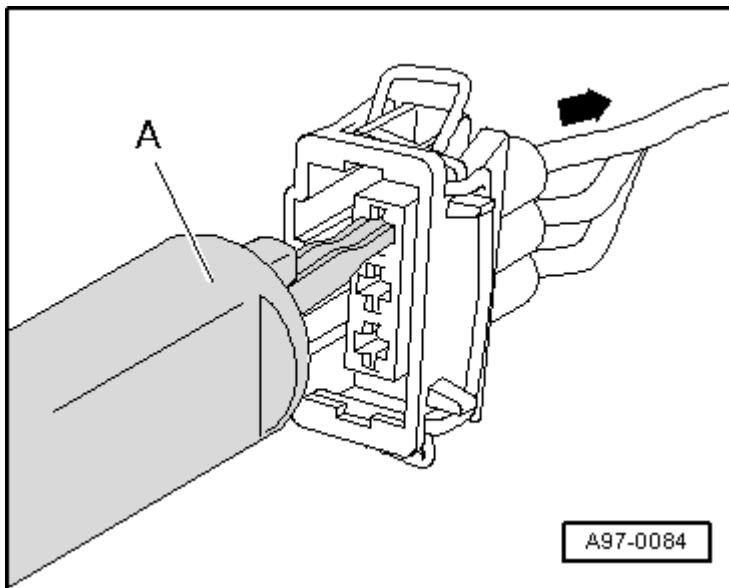


Fig. 35: Identifying Release Tool To Release Terminal Lock

Courtesy of AUDI OF AMERICA, LLC

-- First, open or release if necessary the secondary lock of the connector housing. Refer to **CONTACT HOUSINGS, RELEASING AND DISASSEMBLING**.

-- Release the contact (primary lock) using the appropriate release tool -A -. Refer to **CONTACT HOUSINGS, RELEASING AND DISASSEMBLING**.

-- Pull the contact back out of the connector housing -arrow- at the single wire (with the single wire seal if necessary).

-- Cut off the old contact (with the single wire seal) from the vehicle-specific wiring harness.

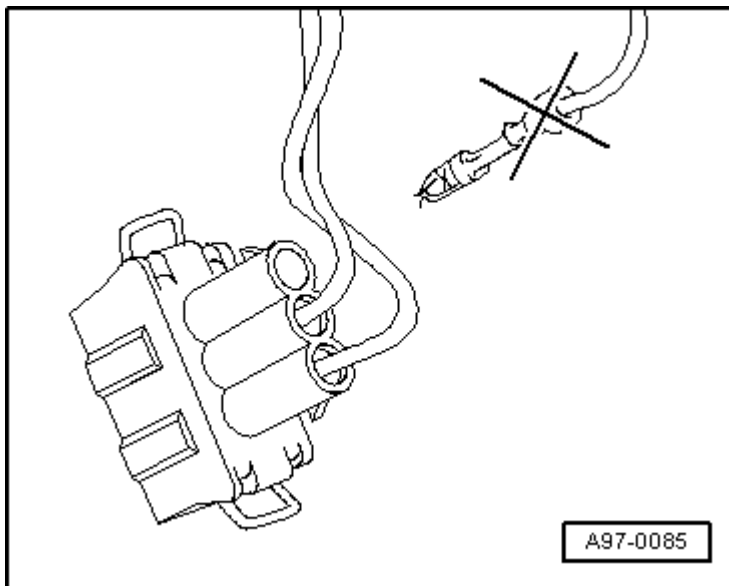


Fig. 36: Cutting Off Old Terminal With Single Wire Seal

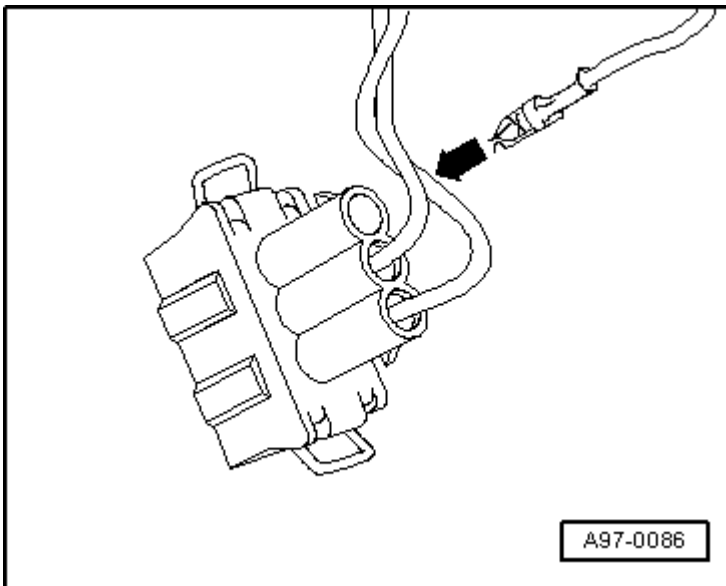
Courtesy of AUDI OF AMERICA, LLC

- Take the yellow repair wire with the correct contact out of the Wiring harness repair set VAS 1978 B.
- Free up the wire to be repaired approximately 20 cm on both sides of the repair point.

CAUTION: Risk of damaging the electrical wires.

- **Expose wrapped wiring harnesses carefully.**

- If necessary, removing the wiring harness wrapping using a knife.
- Slide the new repair wire contact into the corresponding connector housing compartment until it engages.

**Fig. 37: Identifying Inserting New Terminal Into Terminal Housing**

Courtesy of AUDI OF AMERICA, LLC

- If necessary, install the single wire seal on the repair wire. Refer to **SINGLE WIRE SEALS, INSTALLING**.
- Shorten the repair wire and the vehicle-specific wiring harness single wire as needed using the Wire Stripper VAS 1978/3.

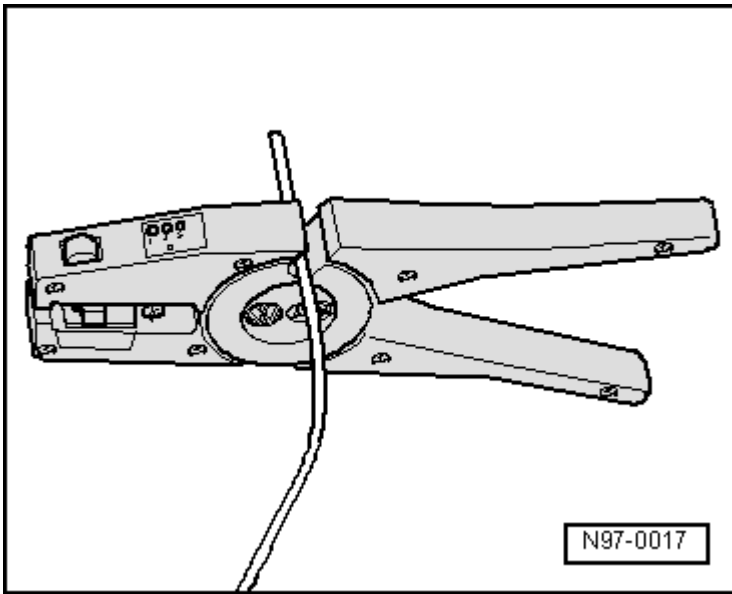


Fig. 38: Cutting Wire

Courtesy of AUDI OF AMERICA, LLC

-- Remove the insulation from the ends of the repair wire and vehicle-specific single wire and crimp the ends with the crimping wires and a crimp connector. Refer to 0.25 MM or 0.35 MM.

SINGLE WIRE SEALS, INSTALLING

Procedure

NOTE:

- Single wire seals prevent the penetration of water and dirt into the connector housing. They are installed e.g. in engine compartment and must be reinstalled after a repair.
- Single wire seal is crimped on at the factory together with contact on the wire, this is not the case for repair wires. The single wire seal must be slid onto the wire before crimping the repair wire.
- Single wire seals must always fit with the repair wire cross-section. Outer circumference of single wire seal is aligned according to chamber circumference of the connector housing. Perform assembly using only the assembly tool with correct fit.

-- Put single wire seal -A- onto free end of repair wire.

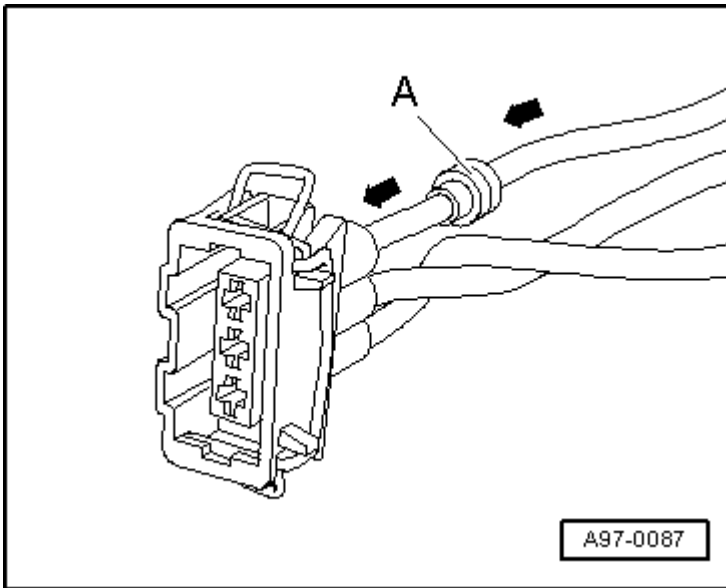


Fig. 39: Identifying Putting Single Wire Seal On To Free End Of Repair Wire
Courtesy of AUDI OF AMERICA, LLC

- When doing this, the single wire seal small diameter must point toward the connector housing.

-- Slide the single wire seal -A- onto the repair wire up to the connector housing and then into the housing as far as the stop using the appropriate assembly tool -B-.

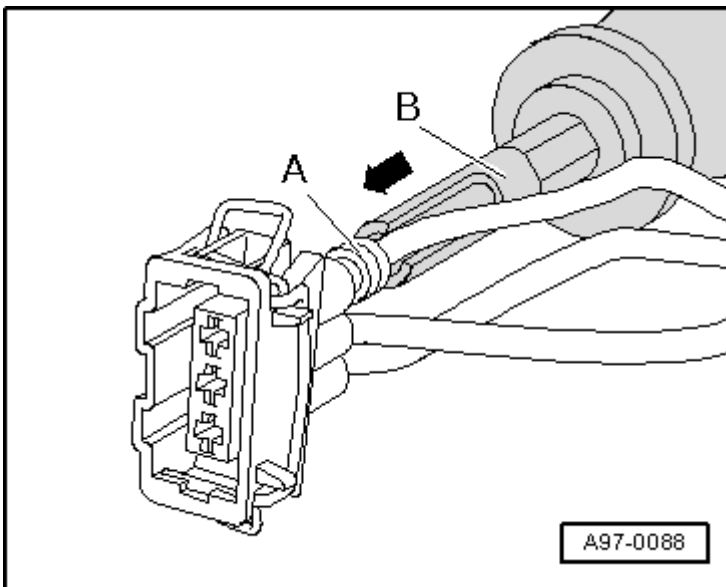


Fig. 40: Identifying Procedure To Insert New Terminal
Courtesy of AUDI OF AMERICA, LLC

CONNECTOR HOUSINGS WITH INSULATION DISPLACEMENT TERMINAL, REPAIRING

NOTE: For technical reasons, connector housings with insulation displacement can be

supplied only with the insulation displacement contacts pushed in.

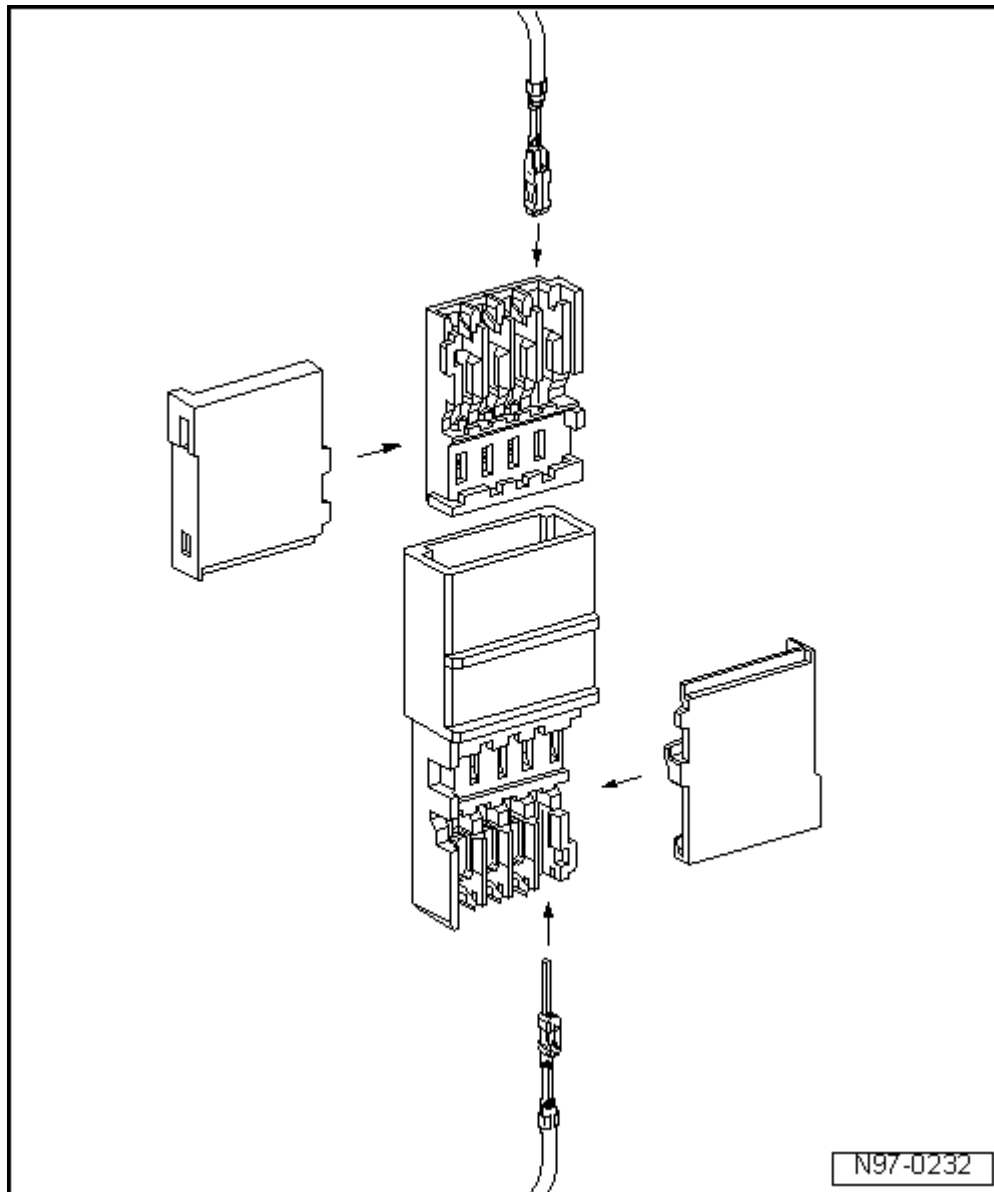


Fig. 41: Identifying Terminal Housings With Insulation Displacement Terminal
Courtesy of AUDI OF AMERICA, LLC

If these contacts are not needed, they can be removed as on any other connector housing.

Repair wires that already have the corresponding contacts crimped on are available.

CONTACT HOUSINGS, RELEASING AND DISASSEMBLING

RELEASING AND DISASSEMBLING CONNECTOR HOUSINGS, GENERAL INFORMATION

WARNING: Risk of injury.

- Some tools are supplied with a tool safety clip, which is slid over the tool points after using the tool, in order to protect other workers from injuries and tool points from damage.

NOTE:

- Observe general notes for repairs to the vehicle electrical system. Refer to **GENERAL NOTES ON REPAIRS ON VEHICLE ELECTRICAL SYSTEM.**
- Always use the release tools intended for the releasing process. Under no circumstances may terminals be pulled forcefully out of connector housings.
- Damaged connector housings must always be replaced.
- Small screwdrivers may be used as an aid to release the secondary locks.
- The pin assignment is partially stamped on the secondary lock or the rear side of the connector housing.
- Detailed information on component locations of harness connectors. Refer to the appropriate **SYSTEM WIRING DIAGRAMS** information.
- Allocation of the correct release tool to the respective retainers, refer to the Operating Instructions that come with VAS 1978/35.

SECONDARY LOCK

- The secondary lock is a housing securing mechanism (second locking mechanism) that secures all wires in one connector housing. If a secondary lock is installed at a connector housing, it must always be opened or removed using specified tool before releasing and pulling out individual crimp contacts.
- Secondary lock is distinguished by a different color from the rest of the connector housing. It simplifies recognizing the secondary lock and clarifies its function.
- The shapes of the connector housings depicted here are only a selection which, as an example, should make clear the various functions of the secondary lock.

Example 1

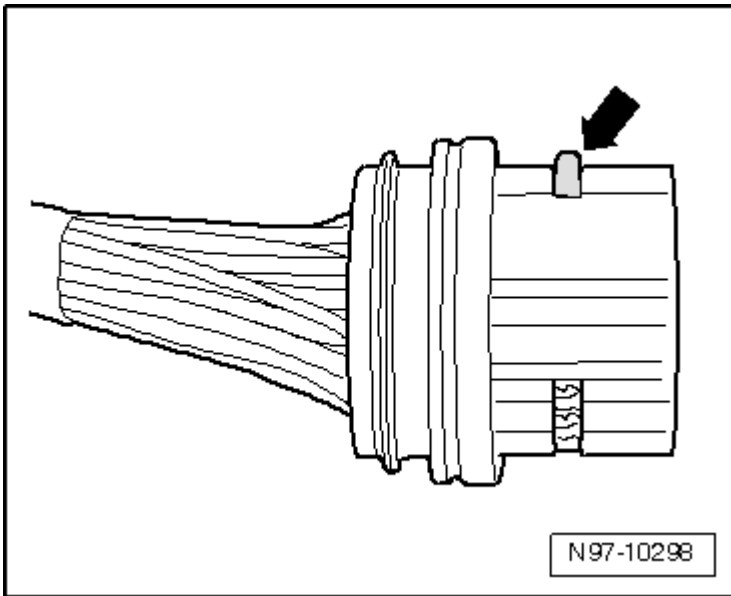


Fig. 42: Identifying Secondary Lock (Comb Type)
Courtesy of AUDI OF AMERICA, LLC

-- Release the housing lock by removing the "comb" -arrow-.

Example 2

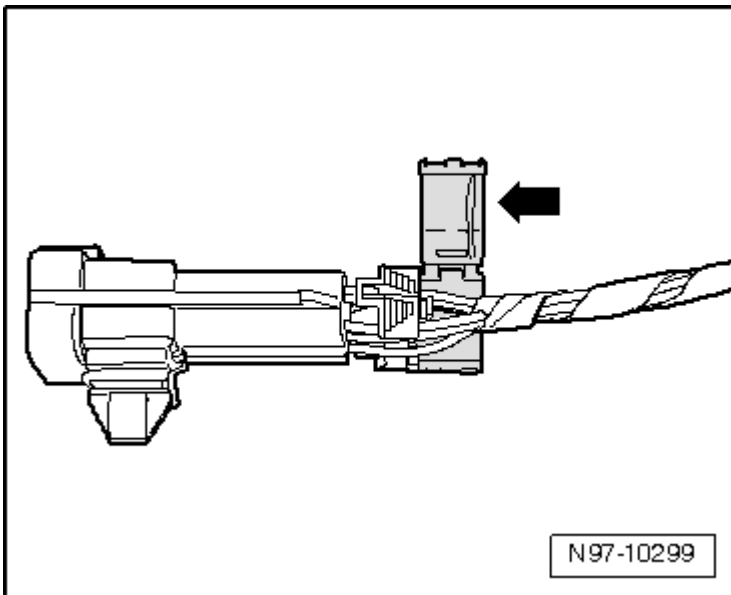


Fig. 43: Identifying Secondary Lock (Flap Type)
Courtesy of AUDI OF AMERICA, LLC

-- Release the housing lock by opening the "lid" -arrow-.

Example 3

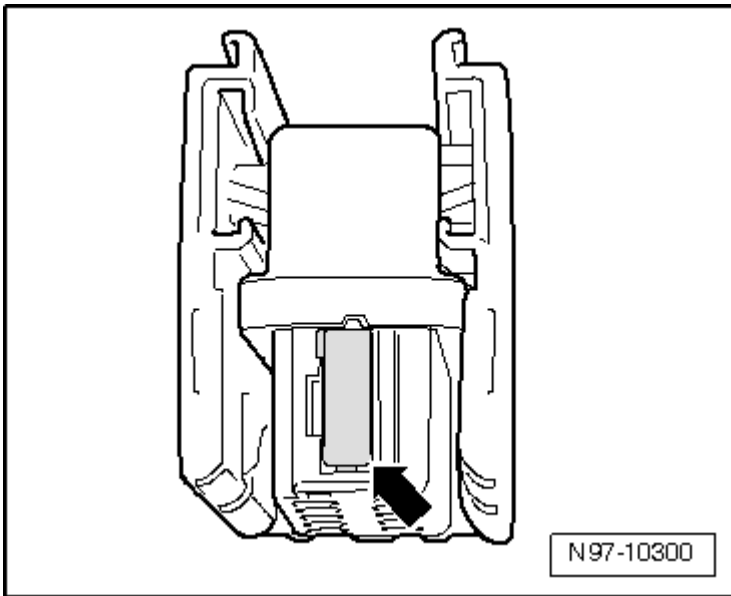


Fig. 44: Identifying Secondary Lock (Slider Type)

Courtesy of AUDI OF AMERICA, LLC

-- Release the housing lock by disengaging a "slider" -arrow-.

PRIMARY LOCK

- The primary lock is the locking mechanism of an individual crimp contact in the connector housing.
- If necessary, housing securing mechanisms (secondary locks) must be released or removed using specified tool before releasing the contacts. Refer to **SECONDARY LOCK**.
- The shapes of the primary locks depicted in the following are only a selection which, as an example, should make clear the various functions of the primary lock.
- Allocation of the correct release tool to the respective locking mechanism, refer to the Operating Instructions that come with VAS 1978/35.

PRIMARY CONNECTOR WITH ROUND CONNECTOR SYSTEMS

Procedure

NOTE: If necessary, housing securing mechanisms (secondary locks) must be released or removed using specified tool before releasing the contacts. Refer to **SECONDARY LOCK**.

-- Guide the release tool which fits the connector housing into release channel on connector housing.

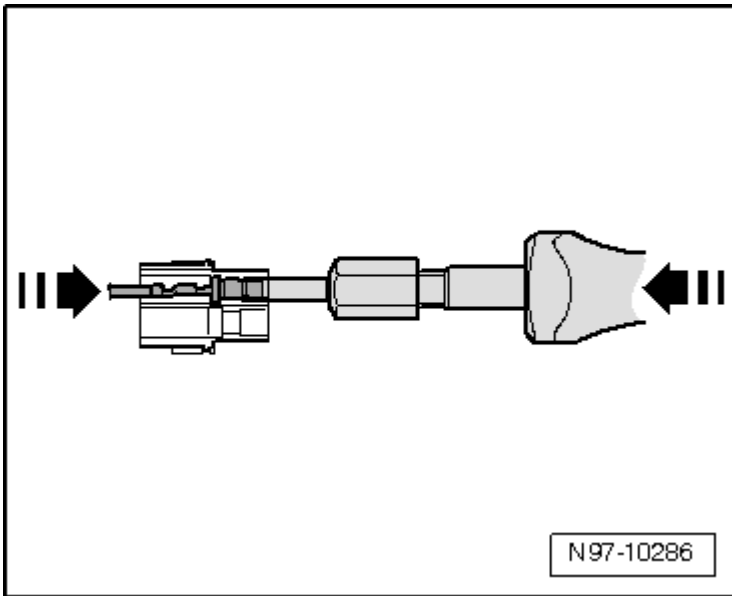


Fig. 45: Identifying Terminal At Wire Pushed Into Terminal Housing
Courtesy of AUDI OF AMERICA, LLC

-- Grasp the contact at the wire and gently push it into the connector housing -left arrow-.

NOTE: By pushing the contact in the direction of the connector housing, contact retaining tabs are lifted off the housing shoulder and can be released using the release tool.

-- At the same time, push the release tool in the direction of the connector housing -right arrow- and pull the released contact out of the connector housing.

-- Remove the release tool after removing the contact from the housing.

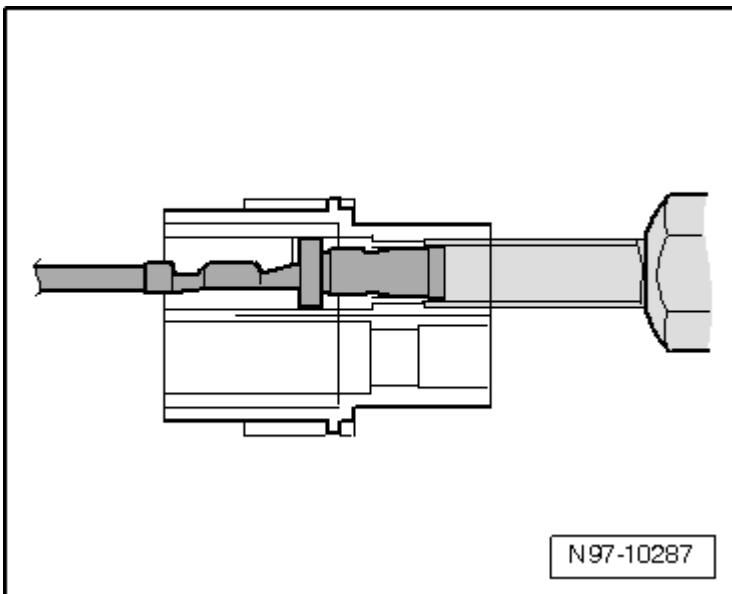


Fig. 46: Identifying Released Terminal Pulled Out From Terminal Housing
Courtesy of AUDI OF AMERICA, LLC

PRIMARY CONNECTOR WITH FLAT CONNECTOR SYSTEMS

Procedure

NOTE: If necessary, housing securing mechanisms (secondary locks) must be released or removed using specified tool before releasing the contacts. Refer to **SECONDARY LOCK**.

Flat Connector System With One Retaining Tab

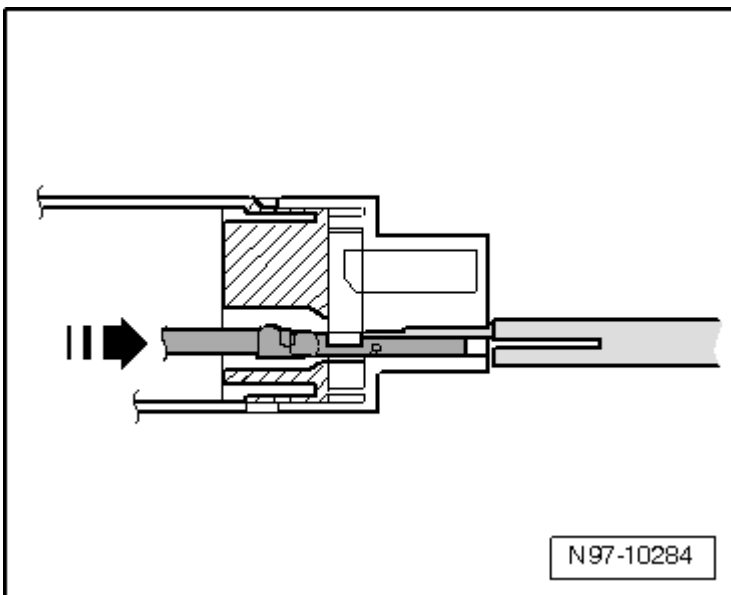


Fig. 47: Identifying Removal Of Flat Connector Terminal With One Retaining Tab (1 Of 2)
Courtesy of AUDI OF AMERICA, LLC

- Guide the release tool which fits the connector housing into release channel on connector housing.
- Grasp contact at wire and push it gently into connector housing -arrow-.

NOTE: By pushing the contact in the direction of the connector housing, the contact retaining tab is lifted off the housing shoulder and can be released using the release tool.

- At the same time, push the release tool in the direction of the connector housing and pull the released contact out of the connector housing -arrow-.

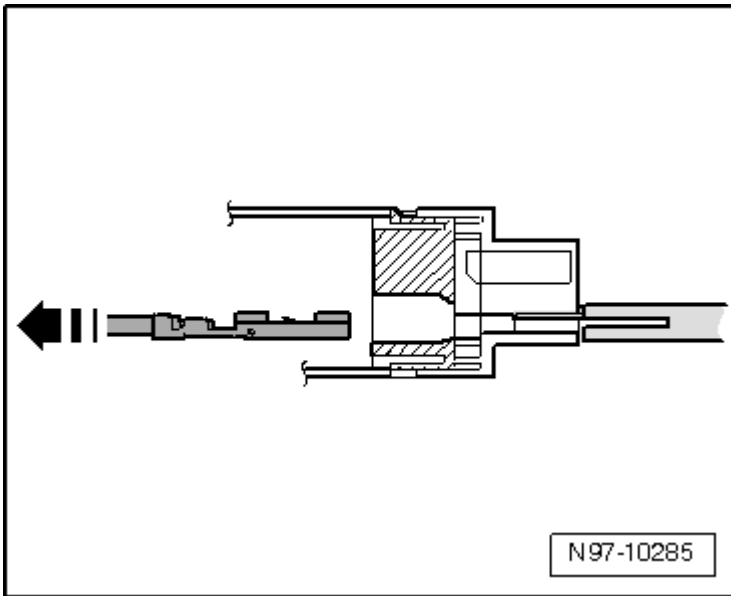


Fig. 48: Identifying Removal Of Flat Connector Terminal With One Retaining Tab (2 Of 2)
Courtesy of AUDI OF AMERICA, LLC

-- Remove the release tool after removing the contact from the housing.

Flat Connector System With Two Retaining Tabs

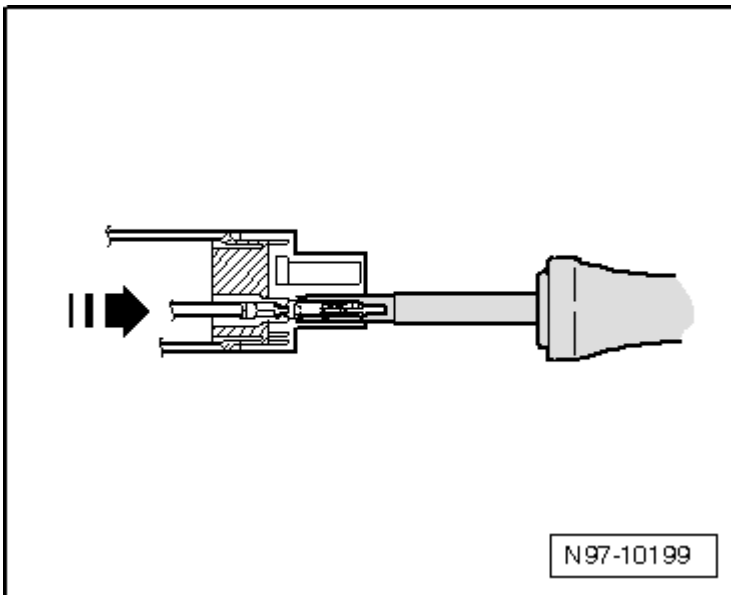


Fig. 49: Identifying Removal Of Flat Connector Terminal With Two Retaining Tab (1 Of 2)
Courtesy of AUDI OF AMERICA, LLC

-- Guide the release tool which fits the connector housing into release channel on connector housing.

-- Grasp contact at wire and push it gently into connector housing until it stops -arrow-.

NOTE: By pushing the contact in the direction of the connector housing, contact retaining tabs are lifted off the housing shoulder and can be released using the release tool.

-- At the same time, push the release tool in the direction of the connector housing and pull the released contact out of the connector housing -arrow-.

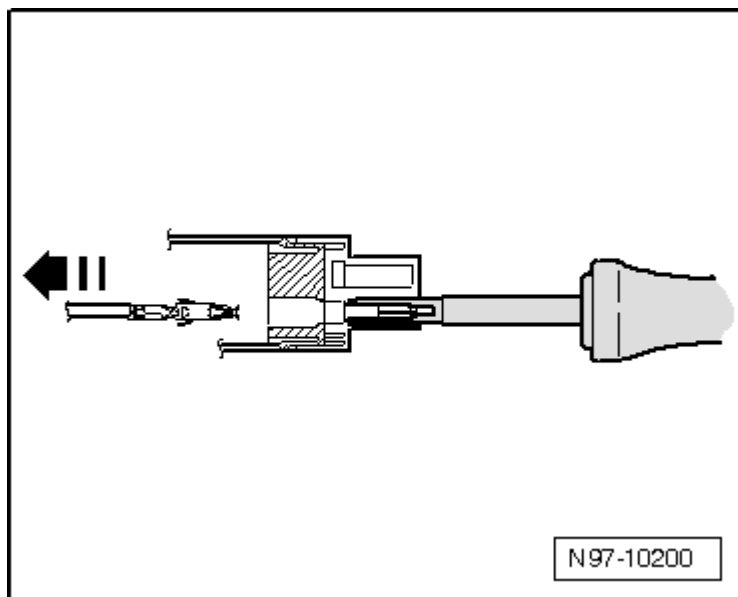


Fig. 50: Identifying Removal Of Flat Connector Terminal With Two Retaining Tab (2 Of 2)
Courtesy of AUDI OF AMERICA, LLC

-- Remove the release tool after removing the contact from the housing.

Asymmetrical

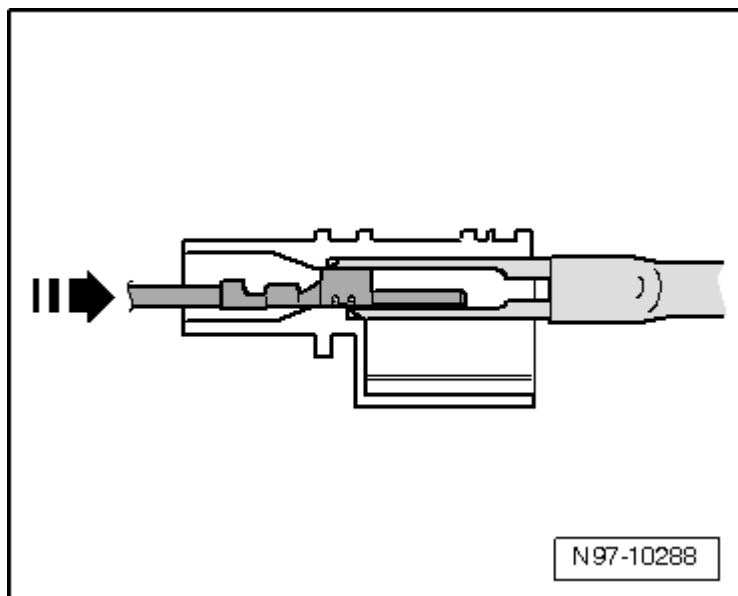


Fig. 51: Identifying Removal Of Asymmetrical Flat Connector Terminal (1 Of 2)

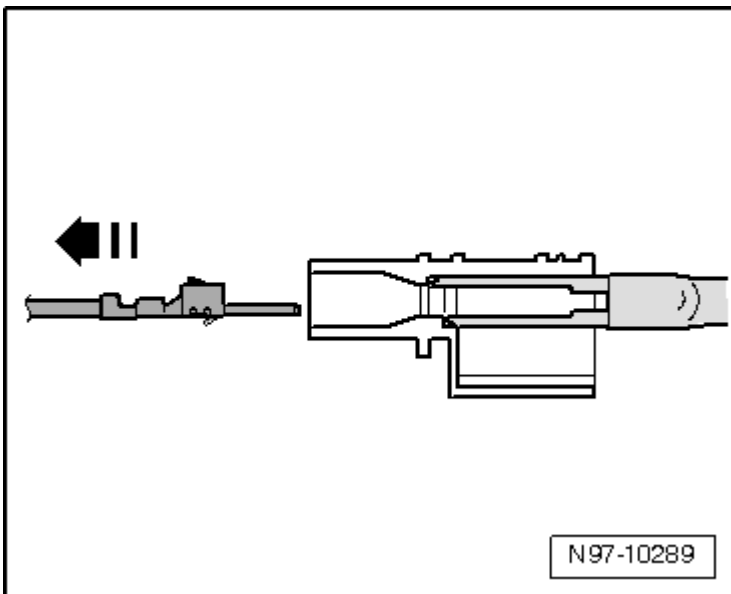
Courtesy of AUDI OF AMERICA, LLC

-- Guide the release tool which fits the connector housing into release channel on connector housing.

-- Grasp contact at wire and push it gently into connector housing -arrow-.

NOTE: By pushing the contact in the direction of the connector housing, contact retaining tabs are lifted off the housing shoulder and can be released using the release tool.

-- At the same time, push the release tool in the direction of the connector housing and pull the released contact out of the connector housing -arrow-.

**Fig. 52: Identifying Removal Of Asymmetrical Flat Connector Terminal (2 Of 2)**

Courtesy of AUDI OF AMERICA, LLC

-- Remove the release tool after removing the contact from the housing.

PRIMARY CONNECTOR WITH SPECIAL CONNECTOR SYSTEMS**Procedure**

NOTE: If necessary, housing securing mechanisms (secondary locks) must be released or removed using specified tool before releasing the contacts. Refer to **SECONDARY LOCK**.

Faston Contacts

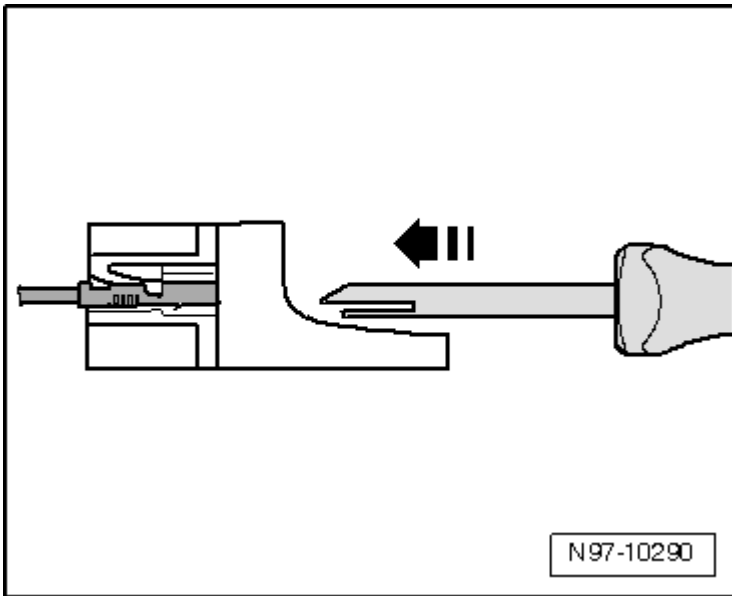


Fig. 53: Identifying Use Of Release Tool To Remove Fasten Connector Terminal
Courtesy of AUDI OF AMERICA, LLC

- Guide the release tool which fits the connector housing into release channel on connector housing -arrow-.
- Grasp contact at wire and push it gently into connector housing.

NOTE: By pushing the contact in the direction of the connector housing, contact retaining tabs are lifted off the housing shoulder and can be released using the release tool.

- At the same time, push the release tool in the direction of the connector housing and pull the released contact out of the connector housing -arrow-.

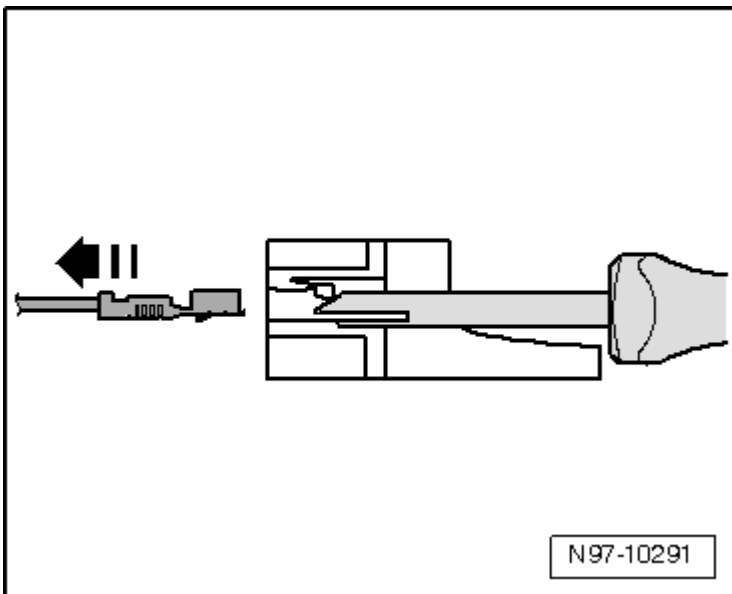
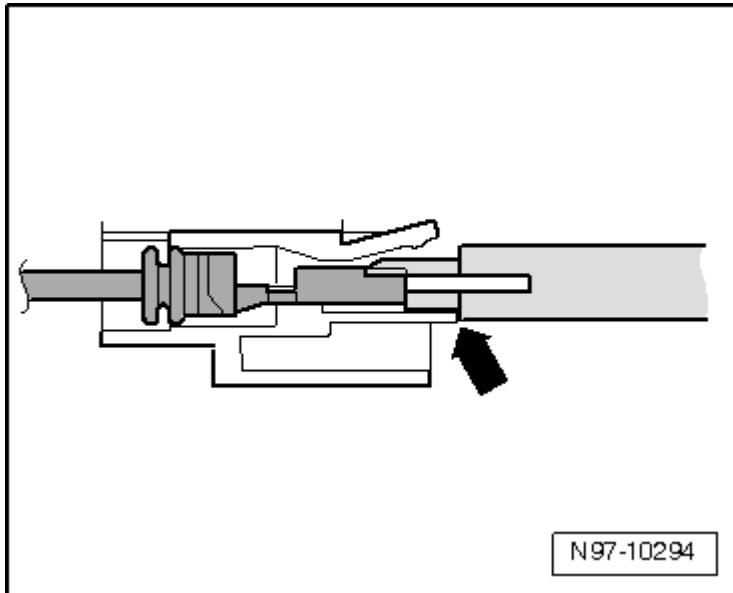


Fig. 54: Identifying Removal Of Fasten Connector Terminal

Courtesy of AUDI OF AMERICA, LLC

-- Remove the release tool after removing the contact from the housing.

GT 150/280 Contacts**Fig. 55: Identifying Removal Of GT 150/280 Connector Terminal (1 Of 2)**

Courtesy of AUDI OF AMERICA, LLC

-- Guide the release tool which fits the connector housing under retaining tab into connector housing.

-- Push tool into connector housing until it stops -arrow-.

- Contact is ejected from the connector housing.

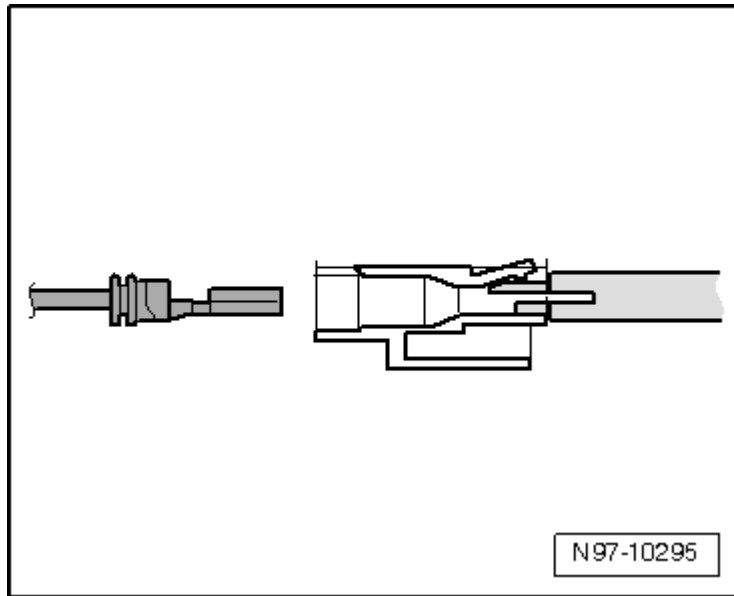


Fig. 56: Identifying Removal Of GT 150/280 Connector Terminal (2 Of 2)
Courtesy of AUDI OF AMERICA, LLC

-- Remove the release tool after removing the contact from the housing.

Contacts Without Retaining Tabs

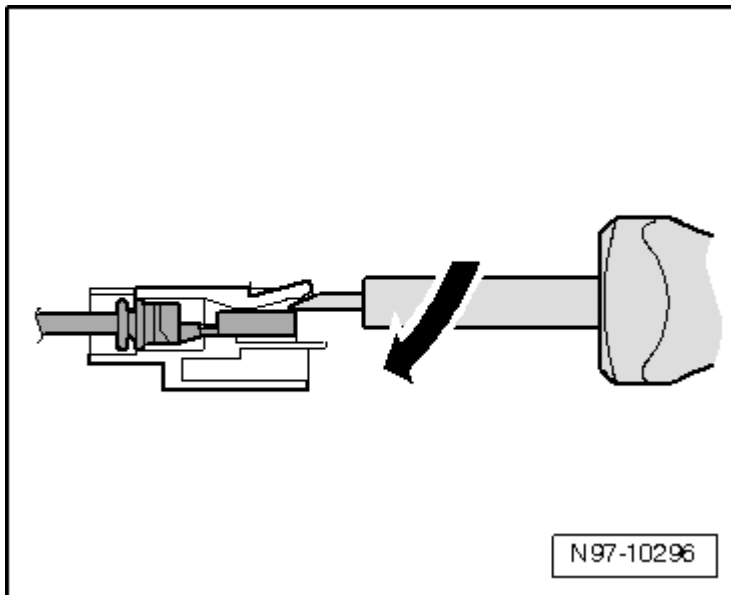


Fig. 57: Identifying Removal Of Connector Terminal Without Releasing Tabs (1 Of 2)
Courtesy of AUDI OF AMERICA, LLC

-- Insert release tool under retaining tab of connector housing.

-- Push release tool through until it stops by gently lifting -arrow-.

- Contact is ejected from the connector housing.

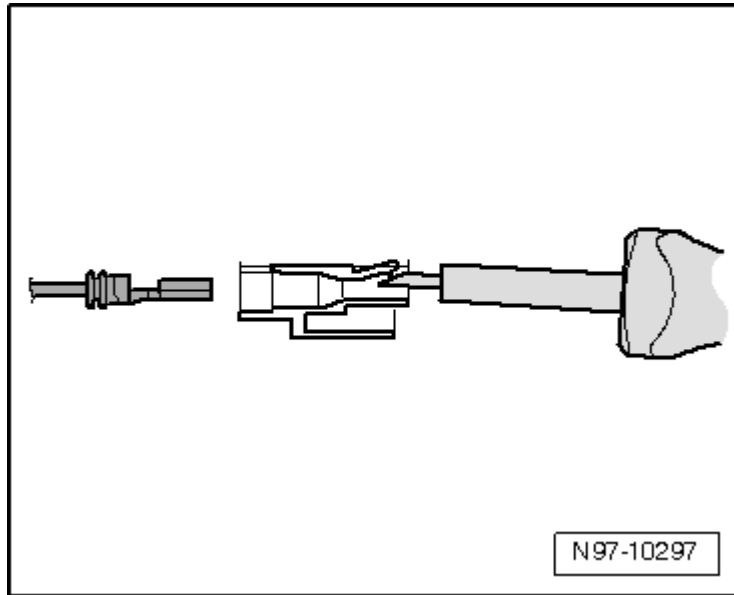


Fig. 58: Identifying Removal Of Connector Terminal Without Releasing Tabs (2 Of 2)
 Courtesy of AUDI OF AMERICA, LLC

-- Remove the release tool after removing the contact from the housing.

CLEANING CONTACT SURFACES WITH THE contact surface cleaning set VAS 6410

WIRING EYELETS, SERVICING

Special tools and workshop equipment required

- Contact Surfaces Cleaning Set VAS 6410

NOTE:

- Using the Contact surface cleaning set VAS 6410 VAS 6410, service work can be performed in the area of the contact sensor on the threaded connection wiring harnesses in the high current circuit (starter and charging current).
- The gray sanding pads are for slight contamination and suitable for "soft surfaces". The red sanding pads are for heavy contamination and suitable for "hard surfaces".

NOTE:

Do not use rust remover, contact spray or grease because the lack of friction will cause the torque to be exceeded when installing and this will lead to the threaded connection breaking.

WARNING: Risk of injury.

- Follow all Warnings and Safety Precautions. Refer to **LEAD-ACID BATTERY WARNINGS AND SAFETY PRECAUTIONS** .

- Disconnect the battery. Refer to **[For engine(s) CAEB, CALA, CCBA] Removal and Installation** .
- Loosen the cap nut and remove the wiring eyelet from the threaded connection.

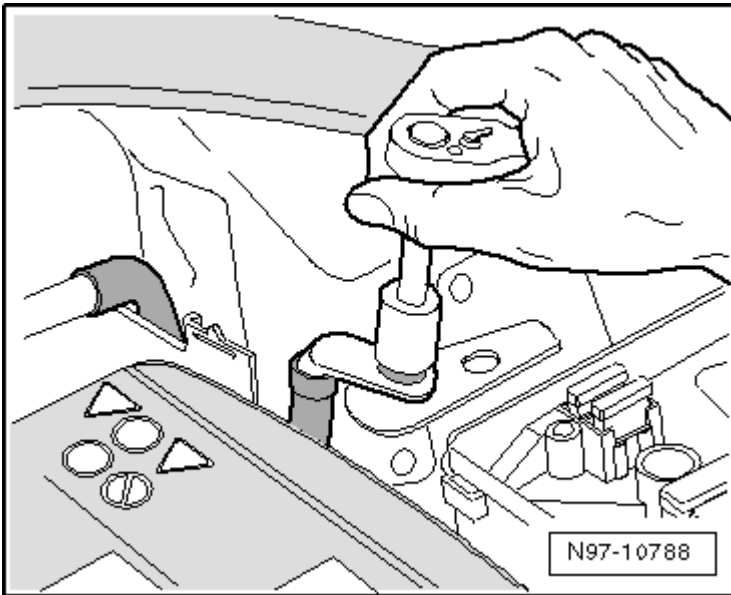


Fig. 59: Disconnecting Battery
Courtesy of AUDI OF AMERICA, LLC

- Check the wiring eyelet for corrosion, contamination, etc.
- Select the corresponding adapter and the corresponding sanding pad.

NOTE: A sanding block can be used instead.

CAUTION: Increased corrosion due to an exposed copper layer.

- Make sure the tin layer is not worn down too much and the copper is not visible. Increased corrosion can result due to the galvanizing effects.

NOTE: Due to the different thicknesses of the tin layer, the cleaning process must be performed in several steps and a visual inspection of the wiring eyelet between steps is necessary.

- Insert the adapter in the wiring eyelet and sand off the corrosion and contamination with circular motion.

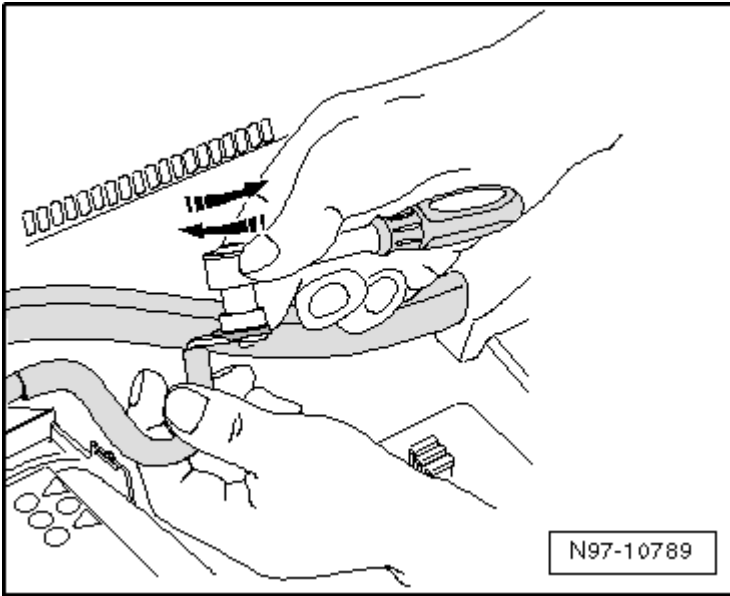


Fig. 60: Inserting Adapter In Wiring Eyelet
Courtesy of AUDI OF AMERICA, LLC

- Check the wiring eyelet and sand it again if necessary.
- If necessary, remove the burr on the wiring eyelet with the deburrer.
- Reinstall the wiring eyelet to the tightening specification.

NOTE: Optimal contact is ensured if the bolted components are tightened to the specified torque after cleaning.

- Protect the connection with the corresponding protection material. Refer to **PROTECTING**.
- Reconnect the battery. Refer to **[For engine(s) CAEB, CALA, CCBA] Removal and Installation**.

THREADED CONNECTIONS, SERVICING

Special tools and workshop equipment required

- Contact Surfaces Cleaning Set VAS 6410

NOTE:

- Using the Contact surface cleaning set VAS 6410 VAS 6410, service work can be performed in the area of the contact sensor on the threaded connection wiring harnesses in the high current circuit (starter and charging current).
- The gray sanding pads are for slight contamination and suitable for "soft surfaces". The red sanding pads are for heavy contamination and suitable for "hard surfaces".

NOTE: Do not use rust remover, contact spray or grease because the lack of friction will cause the torque to be exceeded when installing and this will lead to the threaded connections breaking.

WARNING: Risk of injury.

- Follow all Warnings and Safety Precautions. Refer to LEAD-ACID BATTERY WARNINGS AND SAFETY PRECAUTIONS .

-- Disconnect the battery. Refer to [For engine(s) CAEB, CALA, CCBA] Removal and Installation .

-- Loosen the cap nut and remove the wiring eyelet from the threaded connection.

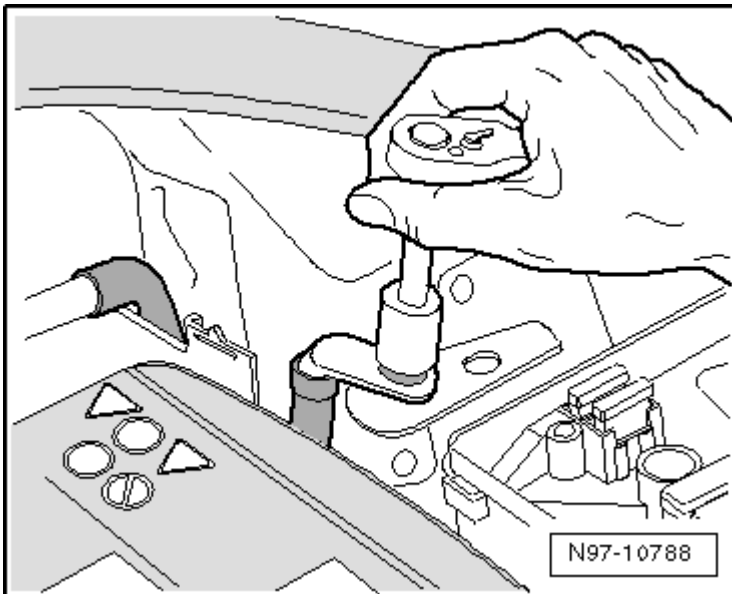


Fig. 61: Disconnecting Battery
Courtesy of AUDI OF AMERICA, LLC

-- Check the threaded connection for corrosion, contamination, etc.

-- Select the corresponding adapter and the corresponding sanding pad for the threaded connection.

CAUTION: Increased corrosion due to an exposed copper layer.

- Make sure the tin layer is not worn down too much and the copper is not visible. Increased corrosion can result due to the galvanizing effects.

NOTE: Due to the different thicknesses of the tin layer, the cleaning process must be performed in several steps and a visual inspection of the threaded connection between steps is necessary.

-- Insert the adapter in the threaded connection and sand off the corrosion and contamination with circular motion.

-- Check the threaded connection and sand it again if necessary.

-- Tighten the connection and, if necessary, the anti-rotation protection to the tightening specification.

NOTE: **Optimal contact is ensured if the bolted components are tightened to the specified torque after cleaning.**

-- Protect the connection with the corresponding protection material. Refer to **PROTECTING**.

-- Reconnect the battery. Refer to **[For engine(s) CAEB, CALA, CCBA] Removal and Installation** .

BATTERY CLAMPS AND TERMINALS, CLEANING

Special tools and workshop equipment required

- Contact Surfaces Cleaning Set VAS 6410

NOTE:

- Using the Contact surface cleaning set VAS 6410 VAS 6410, service work can be performed in the area of the contact sensor on the threaded connection wiring harnesses in the high current circuit (starter and charging current).
- The gray sanding pads are for slight contamination and suitable for "soft surfaces". The red sanding pads are for heavy contamination and suitable for "hard surfaces".

NOTE: Do not use rust remover, contact spray or grease because the lack of friction will cause the torque to be exceeded when installing and this will lead to the battery terminals breaking.

WARNING: Risk of injury.

- Follow all Warnings and Safety Precautions. Refer to **LEAD-ACID BATTERY WARNINGS AND SAFETY PRECAUTIONS** .

-- Disconnect the battery. Refer to **[For engine(s) CAEB, CALA, CCBA] Removal and Installation** .

-- Check the battery terminal clamp and battery terminal for corrosion and dirt.

-- Clean the battery terminal with a wire brush and battery terminal cleaner -arrows-.

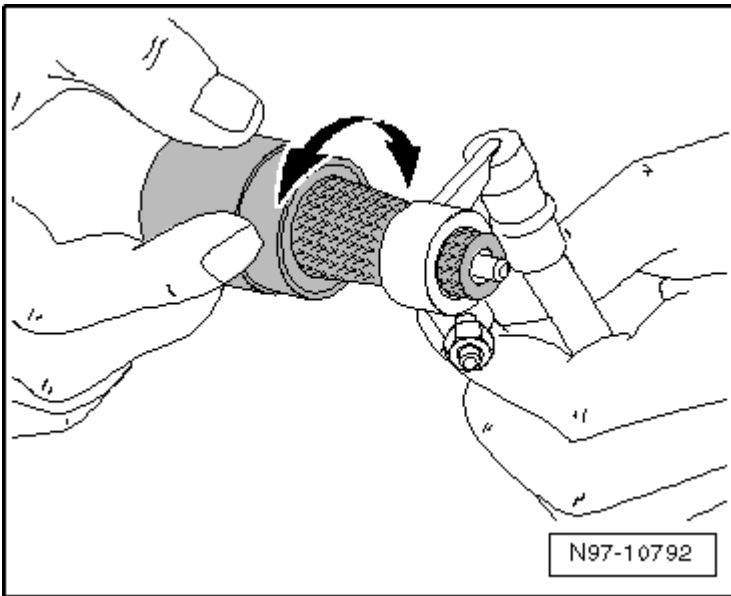


Fig. 62: Cleaning Battery Terminal Clamp
Courtesy of AUDI OF AMERICA, LLC

-- Clean the battery terminal with the bottom side of the battery terminal cleaner with circular motions.

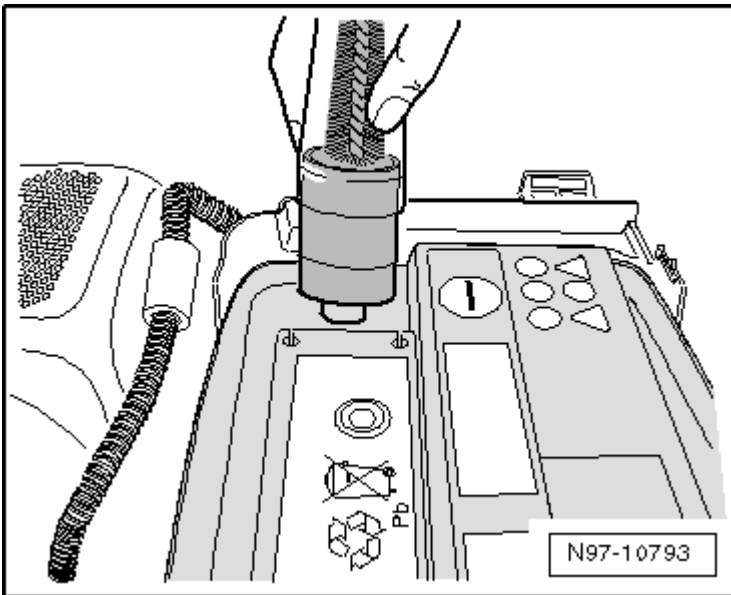


Fig. 63: Cleaning Battery Terminal
Courtesy of AUDI OF AMERICA, LLC

-- Reconnect the battery. Refer to **[For engine(s) CAEB, CALA, CCBA] Removal and Installation** while paying attention to the specified torque for the battery terminal clamps.

NOTE: Optimal contact is ensured if the bolted components are tightened to the specified torque after cleaning.

PROTECTING**Special tools and workshop equipment required**

- Contact Surfaces Cleaning Set VAS 6410

NOTE:

- Using the Contact surface cleaning set VAS 6410 VAS 6410, service work can be performed in the area of the contact sensor on the threaded connection wiring harnesses in the high current circuit (starter and charging current).
- The gray sanding pads are for slight contamination and suitable for "soft surfaces". The red sanding pads are for heavy contamination and suitable for "hard surfaces".

CAUTION: Danger of corrosion.

- Missing protection leads to the electrical system damage.

NOTE:

- All threaded connections must be tightened to the specified torque.
- Always use the accompanying hose on the protection container.
- Protection wax is used in the cool area and cavity protection wax is used in the warm area.
- The protection material draws itself into the affected places by capillary action.

-- Hold the injector under the wiring eyelet and spray all around the pins.

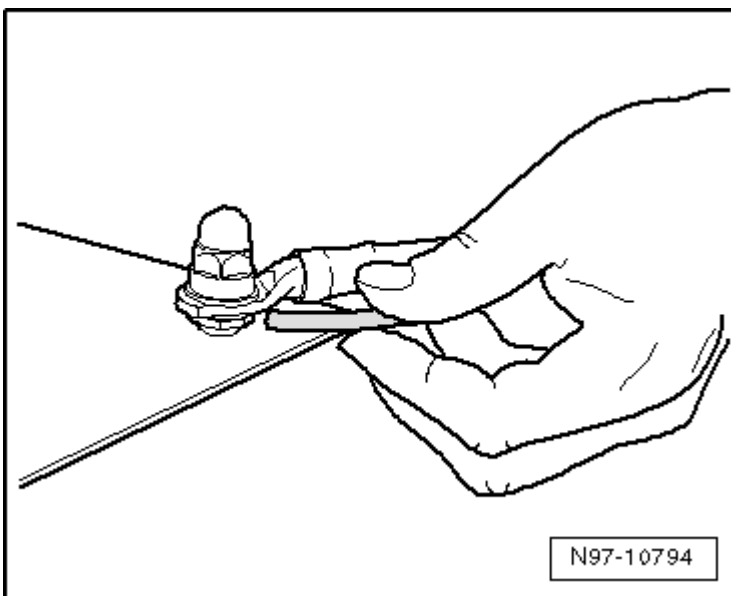


Fig. 64: Holding Injector Under Wiring Eyelet

Courtesy of AUDI OF AMERICA, LLC

-- Hold the injector above the wiring eyelet and spray all around the pins and wiring eyelet.

VEHICLE DIAGNOSIS, TESTING AND INFORMATION SYSTEMS

APPLICATION INFORMATION AND SAFETY PRECAUTIONS

Audi A1, Audi A2, Audi A3, Audi A4, Audi A4 Cabriolet, Audi A5, Audi A6, Audi A7, Audi A8, Audi Q3, Audi Q5, Audi Q7

WARNING: Distraction and inadequately secured measuring equipment poses an accident risk.

There is a risk due to deployment of the front passenger airbag in an accident.

- Operating measuring equipment while driving creates a distraction.
- There is an increased risk of injury if measuring equipment is not secured.
- Always secure measuring equipment with a strap on the rear seat and have a 2nd person in the rear seat operate it.

Audi TT and Audi R8

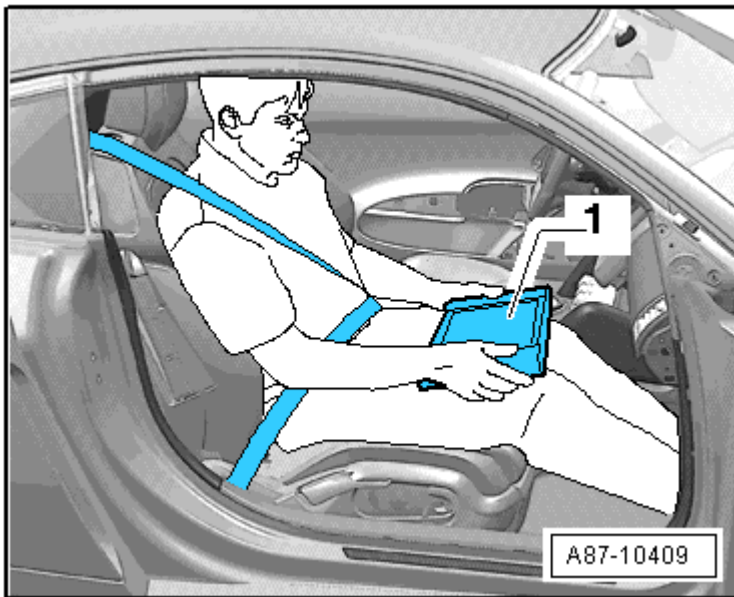


Fig. 65: Diagnostic Tester Operator Wearing Safety Belt
Courtesy of AUDI OF AMERICA, LLC

WARNING: Distraction and inadequately secured measuring equipment poses an accident risk.

There is a risk due to deployment of the front passenger airbag in an accident.

- Operating measuring equipment while driving creates a distraction.
- There is an increased risk of injury if measuring equipment is not secured.
- Position the passenger's seat as far back as possible.
- Only use the Vehicle Diagnostic Tester.
- Measuring equipment -1- must lie flat on the passenger's legs and be operated by that person, as shown in the illustration.

NOTE:

- The Vehicle Diagnostic Tester can perform all adaptations, coding, etc.
- All work instructions can be reached in the operating modes "Guided Fault Finding" and "Guided Functions".

CONNECTING THE VEHICLE DIAGNOSTIC TESTER

Special tools and workshop equipment required

- Vehicle Diagnostic Tester and diagnostic cable

NOTE:

Follow the current instructions on the Vehicle Diagnostic Tester. Use the Administration and User Documentation buttons.

Procedure

- Engage the parking brake or operate the electromechanical parking brake.
- Shift the shifter lever into neutral or place the selector lever in the "P" or "N" position.
- Turn off the ignition and connect the Vehicle Diagnostic Tester to the diagnostic connection with the diagnostic cable -arrow-.

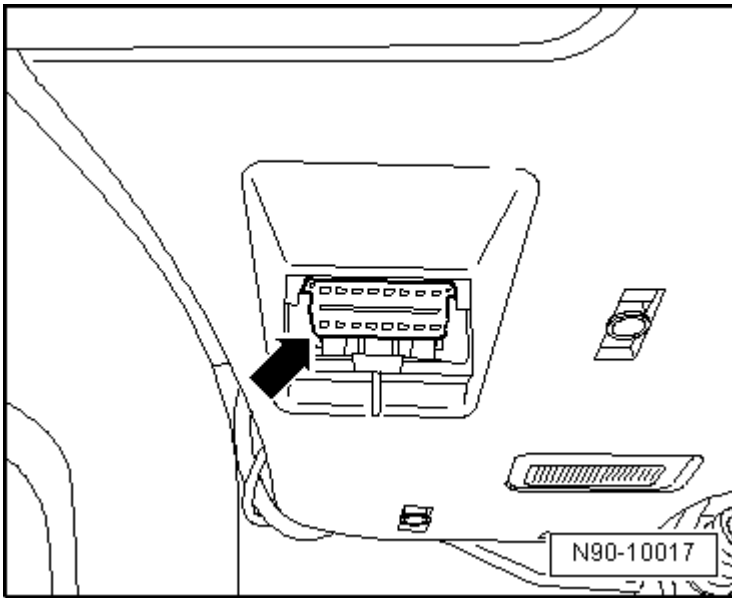


Fig. 66: Locating Data Link Connector
Courtesy of AUDI OF AMERICA, LLC

-- When using the Remote diagnosis head VAS 5054 A or the Diagnosis interface VAS 5055 refer to the Operating Instructions.

-- Switch on ignition.

-- Turn off all electrical consumers.

NOTE: If a error message appears on the screen of the Vehicle Diagnostic Tester, refer to the Operating Instructions.

WIRING HARNESSES AND CONNECTORS, REPAIRING

GENERAL NOTES FOR REPAIRING WIRING HARNESSES AND CONNECTORS

- NOTE:**
- Observe general notes for repairs on the vehicle electrical system. Refer to **GENERAL NOTES ON REPAIRS ON VEHICLE ELECTRICAL SYSTEM.**
 - The Wiring harness repair set VAS 1978 B does not contain all the wire cross-sections in the vehicle. If the required wire cross-section is not present, the next greater cross-section must be used.
 - For repairs on the vehicle electrical system, soldering is not permitted.
 - Do not repair crimp connectors. If necessary, lay a wire parallel to the faulty wire.
 - After crimping, crimp connections must be heat-shrunk using the hot air blower to prevent moisture penetration.
 - Shielded wires such as for speed sensors and knock sensors may not be repaired. If faulty, the entire harness must be replaced.

- Exclusive use is to be made of yellow wires for wiring harness repairs.
- Wiring harness repairs should not be made again in the wrapping on the vehicle-specific wiring harness.
- Mark repaired areas using yellow adhesive tape.
- Yellow wires and areas in the wiring harness wrapped with yellow adhesive tape mark a previously performed repair.
- Perform a function test after each repair. If necessary, check DTC memory, erase and/or bring systems into basic setting.

GENERAL NOTES ON REPAIRS ON VEHICLE ELECTRICAL SYSTEM**Special tools and workshop equipment required**

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

- CAUTION:**
- Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.
 - Observe the country-specific requirements.

- NOTE:**
- Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.
 - Repairs on open circuits and faulty connectors are also explained using examples.

WARNING: Risk of injury.

- Pay attention to decals designating high voltage components. When performing repairs, residual voltage must be discharged.
- Some tools are supplied with a tool safety clip, which is slid over the tool points after using the tool, in order to protect other workers from injuries and tool points from damage.

- CAUTION:**
- Observe the country-specific requirements.
 - By disconnecting the battery ground (GND) wire, safe work on the vehicle electrical system is guaranteed. With the ignition switched off, disconnect the ground wire on the battery. Refer to [For engine(s) CAEB, CALA, CCBA] Removal and Installation .
 - Before starting a repair, the cause of the damage must be eliminated first, such as, sharp edges on chassis parts, faulty electrical consumers, corrosion, etc.

- NOTE:**
- If possible, do not loosen the ground (GND) straps from body (danger of

corrosion).

- Further information relating for example to the removal and installation of individual components can be found in the appropriate repair information.

ELECTRO-STATIC DISCHARGE WORK SURFACE VAS 6613

CAUTION:

- Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.
- Observe the country-specific requirements.

NOTE:

- Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.
- Repairs on open circuits and faulty connectors are also explained using examples.
- The electro-static discharge work surface VAS 6613 protects electronic components from getting damaged by an electro-static charge.
- This makes it possible to perform repairs on sensitive electronic components on an open mat.
- For more information as to what work can be performed on the electro-static discharge work surface VAS 6613, refer to "Electrical Equipment" in the appropriate repair information.

-- Place the electro-static discharge mat -3- from VAS 6613 on a clean, dry table.

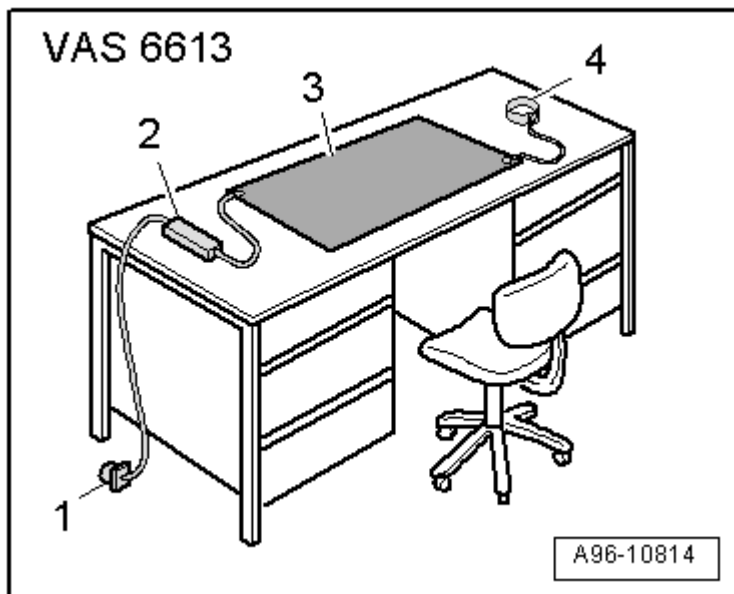


Fig. 67: Identifying Electro-Static Discharge Work Surface VAS 6613
Courtesy of AUDI OF AMERICA, LLC

-- Connect the ground -2- to one of the buttons on the mat.

-- Connect the ground connector adapter -1- to the adapter connector on a outlet with contact protection or connect the alligator clip to a ground in the building or a water pipe.

-- Connect the wrist strap -4- to one of the buttons on the mat.

-- Attach the wrist strap directly to your wrist - never to your shirt sleeve or jacket sleeve.

CAUTION: If working on especially sensitive electronic component and with the pad exposed, use only non-magnetic tools, for example, a socket wrench T10072

PYROTECHNIC COMPONENT WIRE, REPAIRING

Special tools and workshop equipment required

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

CAUTION:

- Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.
- Observe the country-specific requirements.

NOTE:

- Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.
- Repairs on open circuits and faulty connectors are also explained using examples.

NOTE:

- Observe general notes for repairs on the vehicle electrical system. Refer to GENERAL NOTES ON REPAIRS ON VEHICLE ELECTRICAL SYSTEM.
- Observe the notes on wiring harness and connector repairs. Refer to GENERAL NOTES FOR REPAIRING WIRING HARNESSSES AND CONNECTORS including identifying repair locations.

WARNING: Passenger protection malfunction due to faulty repairs to the wires for pyrotechnic components - for example, airbag, belt tensioner.

- Repairs to wires for pyrotechnic components may only be performed on the vehicle side using the Wiring harness repair set VAS 1978 B and original replacement parts (connector housing, contacts, wires) in order to guarantee the repair quality required by Audi AG.
 - Wires at individual airbag units may not be repaired.
 - If the wires or connectors on the airbag units are damaged, the respective airbag unit must be replaced for safety reasons.
- A maximum of two repairs may be performed when repairing wires for pyrotechnic components. Repairs

increase the electrical resistance in the wire and may trigger malfunctions in the system On Board Diagnostic (OBD).

- Repairs in the area of the pyrotechnic components should be performed a maximum of 30 cm from the next connector housing. Together with the identification using yellow adhesive tape, this procedure makes it possible to obtain a quick overview of previously performed repairs.
- Both wires to the airbag igniter have a twist with 20 +/- 5 mm routing length. This routing length must be maintained when repairing the twisted wires.

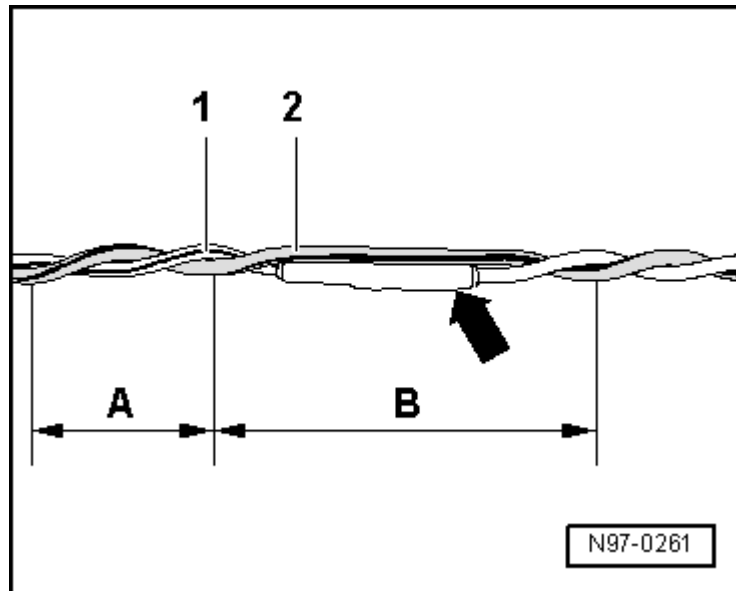


Fig. 68: Identifying Repair In Twisted Wire Pairs
Courtesy of AUDI OF AMERICA, LLC

- When repairing, both wires to the airbag igniters must be the same length. When twisting the wires -1 and 2- together, the -A- = 20 mm routing length must be maintained.
- While doing so, no section of wire may be greater than -B- = 100 mm without twisting the wires, for example, in the area of crimp connectors -arrow-.
- Repairs are to be documented in the Audi Service Plan under "Space for workshop entries" with a short commentary of scope of repairs, workshop stamp and signature.
- Any warranty claims to Audi AG are void for repairs on airbag wiring harness which were not performed using original replacement parts and VAS 1978 B.

CAN BUS WIRE, REPAIRING

Special tools and workshop equipment required

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

CAUTION:

- Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.
- Observe the country-specific requirements.

NOTE:

- Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.
- Repairs on open circuits and faulty connectors are also explained using examples.

NOTE:

- Observe general notes for repairs on the vehicle electrical system. Refer to GENERAL NOTES ON REPAIRS ON VEHICLE ELECTRICAL SYSTEM.

Observe the notes on wiring harness and connector repairs. Refer to GENERAL NOTES FOR REPAIRING WIRING HARNESSES AND CONNECTORS including identifying repair locations.

CAUTION: An unshielded two-strand wire -1 and 2- with a cross section of 0.35 mm^2 or 0.5 mm^2 can be used as CAN-Bus wiring.

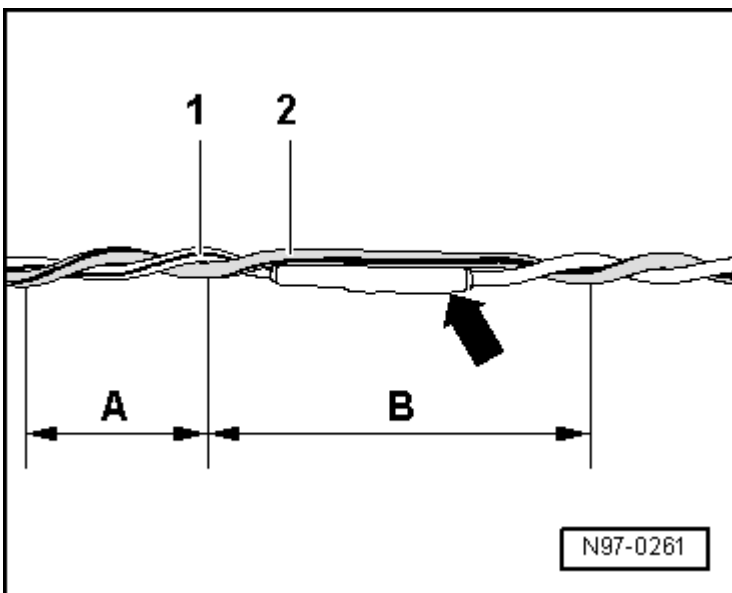


Fig. 69: Identifying Repair In Twisted Wire Pairs
Courtesy of AUDI OF AMERICA, LLC

- CAN bus wires have the following color coding:

Powertrain	
CAN bus	orange/black
high wire	
Comfort	
CAN bus	orange/green
high wire	
Infotainment	orange/violet
CAN Bus	

High wire
CAN bus
wiring Low orange/brown
wire

- When repairing CAN bus wires, both wires must be same length.
- When twisting the wires -1 and 2- together, the -A- = 20 mm routing length must be maintained.
- While doing so, no section of wire may be greater than -B- = 50 mm without twisting the wires, e.g. in the area of crimp connectors -arrow-.

FLEXRAY WIRE, REPAIRING

Special tools and workshop equipment required

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

CAUTION:

- Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.
- Observe the country-specific requirements.

NOTE:

- Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.
- Repairs on open circuits and faulty connectors are also explained using examples.

NOTE:

- Observe general notes for repairs on the vehicle electrical system. Refer to GENERAL NOTES ON REPAIRS ON VEHICLE ELECTRICAL SYSTEM.
- Observe the notes on wiring harness and connector repairs. Refer to GENERAL NOTES FOR REPAIRING WIRING HARNESSSES AND CONNECTORS including identifying repair locations.

A two-layer wire -1 and 2- with a 0.35 mm² profile is used as a FlexRay wire.

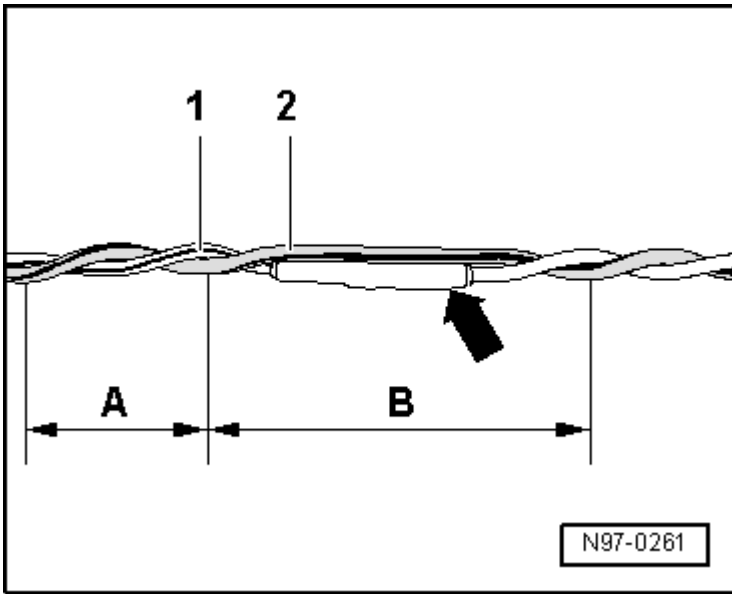


Fig. 70: Identifying Repair In Twisted Wire Pairs

Courtesy of AUDI OF AMERICA, LLC

- During repair work, both wires must have the same length.
- When twisting the wires -1 and 2- together, the -A- = 30 mm (1.2 in.) routing length must be maintained.
- While doing so, no section of wire may be greater than -B- = 50 mm (2 in.) without twisting the wires, for example, in the area of crimp connectors -arrow-.
- Maximum exposed wire length: -C- = 100 mm (4 in.)

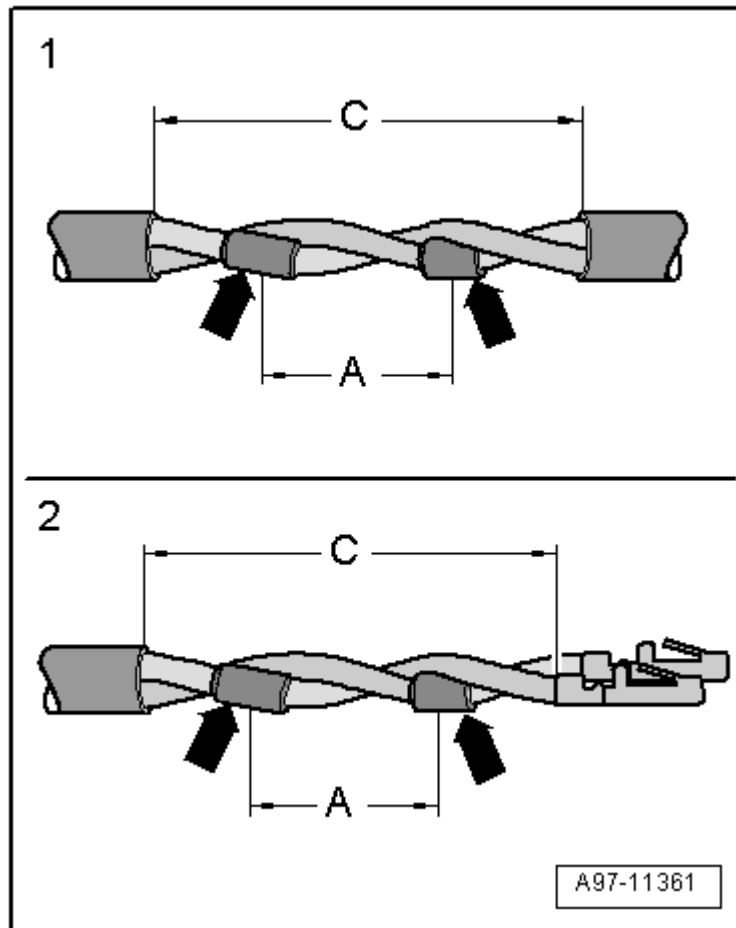


Fig. 71: Identifying Exposed Wire
 Courtesy of AUDI OF AMERICA, LLC

- Protect the area being repairs from the environment. Use a crimp connector with heat-shrinkable tube over the untwisted location being repairs and waterproof insulation over the exposed wire.
- Mark the location of the repair with something suitable, for example, with yellow tape.
- Repairing both wires is identical to repair just one wire.
- Position both repaired location -arrows- -A- = 30 mm (1.2 in.) opposite each other.
- Crimp the cables with connectors.

1 - Repair location in the area without insulation

2 - Repair location with connectors

C - Maximum exposed length = 100 mm (4 in.)

0.25 MM 2 WIRE WITH INDIVIDUAL CRIMP CONNECTOR, REPAIRING

Special tools and workshop equipment required

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

CAUTION:

- Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.
- Observe the country-specific requirements.

NOTE:

- Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.
- Repairs on open circuits and faulty connectors are also explained using examples.

Procedure

-- Free up the wire to be repaired approximately 20 cm on both sides of the repair point.

CAUTION: Risk of damaging the electrical wires.

- Expose wrapped wiring harnesses carefully.

-- If necessary, removing the wiring harness wrapping using a knife.

-- Cut out the damaged wire section using wire stripper VAS 1978/3.

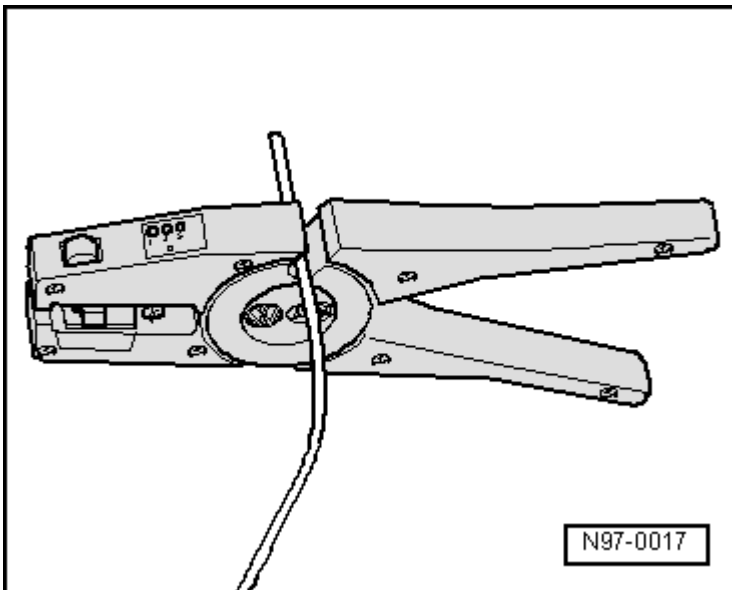


Fig. 72: Cutting Wire

Courtesy of AUDI OF AMERICA, LLC

NOTE:

If, by cutting out the damaged wire section, both ends of the vehicle-specific single wire are too short for a repair using a single crimp connector, insert a

repair wire section of matching length with two crimp connections. Refer to 0.25 MM.

-- Adjust the sliding stop in the VAS 1978/3 jaws to 12 to 14 mm for the wire to be stripped.

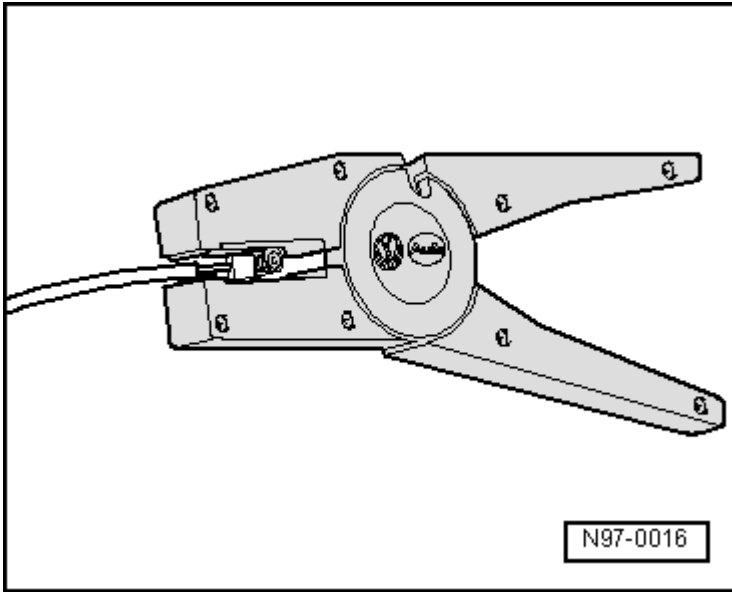


Fig. 73: Identifying Stripping Pliers To Strip Wiring Insulation
Courtesy of AUDI OF AMERICA, LLC

- Insert wire end from front up to stop into jaws of pliers and squeeze the pliers completely.
- Open pliers again and remove the stripped wire end.
- Twist bare strands one-half turn.
- For the repair of a 0.25 mm² wire, use a small yellow crimp connector from the VAS 1978 B.
- Use crimping pliers (base tool) VAS 1978/1-2 with exchangeable head, 0.35 mm² - 2.5 mm² VAS 1978/1-1.

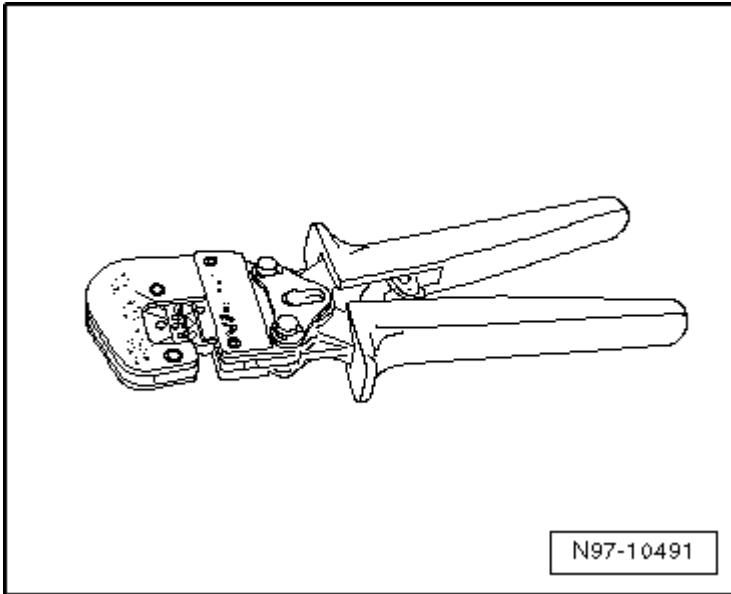


Fig. 74: Crimping Pliers

Courtesy of AUDI OF AMERICA, LLC

-- Slide the small yellow crimp connector onto both stripped, non-insulated wire ends on the vehicle-specific single wire and crimp them using crimp pliers.

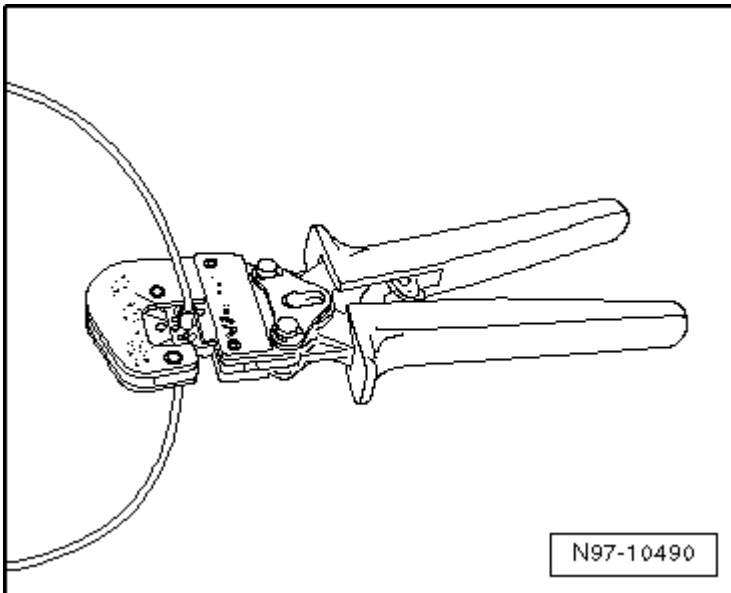


Fig. 75: Crimping A Single Break Point

Courtesy of AUDI OF AMERICA, LLC

NOTE: Do not crimp wire insulation.

After crimping, crimp connections must be heat-shrunk using hot air gun to prevent moisture penetration.

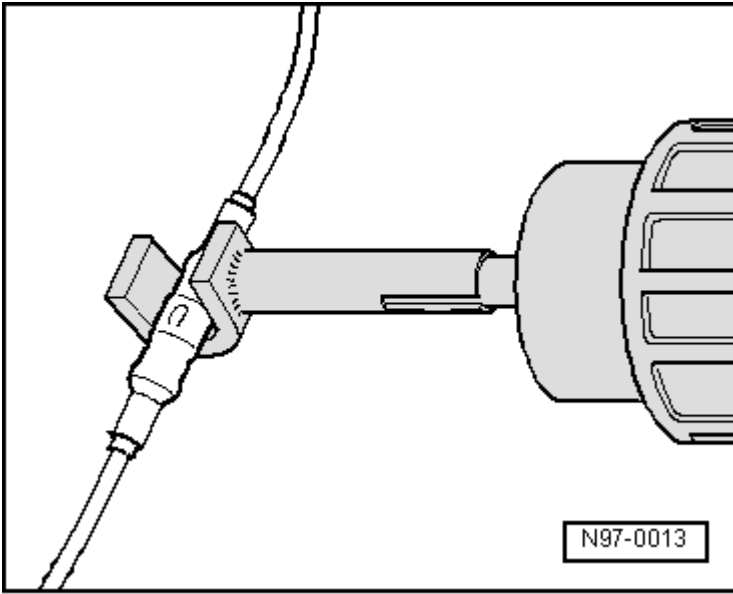


Fig. 76: Heating Crimp Connection Using Hot Air Gun
Courtesy of AUDI OF AMERICA, LLC

-- Place the shrink element for hot air blower VAS 1978/15A on the hot air blower VAS 1978/14A.

CAUTION: Risk of damaging surrounding components.

- When heat-shrinking crimp connections, be careful not to damage any other wiring, plastic parts or insulating material with the hot nozzle of the hot air blower.
- Always observe operating instructions of heat gun.

-- Heat crimp connection using the hot air blower lengthwise from center outward until it is sealed completely and adhesive comes out the ends.

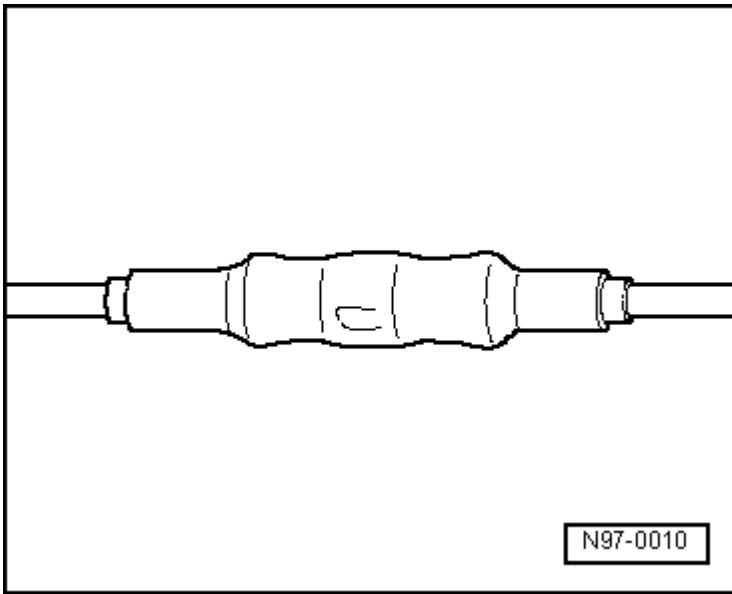


Fig. 77: Identifying Single Repair Point

Courtesy of AUDI OF AMERICA, LLC

- This is how the completed repair location with individual crimp connector should appear.

NOTE:

- Make sure that crimp connections do not lie directly next to each other when several wires need to be repaired. Arrange the crimp connectors at a slight offset so that the circumference of the wiring harness does not become too large.

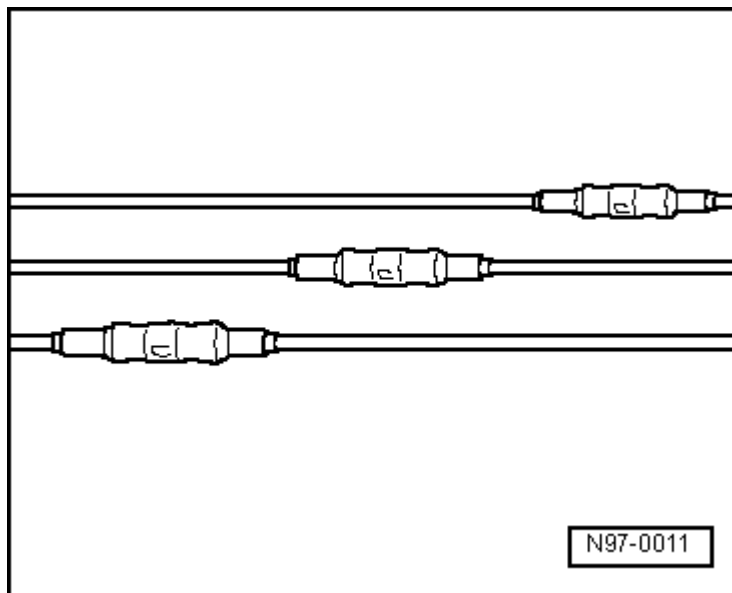


Fig. 78: Identifying Offset Positions Of Crimped Connections

Courtesy of AUDI OF AMERICA, LLC

- If the repair point was previous taped, this point must be taped again with

yellow insulating tape after repairs.

- **Secure the repaired wiring harness if necessary with a cable tie to prevent flapping noises while driving.**

0.25 MM2 WIRE WITH INTERMEDIATE WIRE SECTION, REPAIRING

Special tools and workshop equipment required

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

CAUTION:

- **Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.**
- **Observe the country-specific requirements.**

NOTE:

- **Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.**
- **Repairs on open circuits and faulty connectors are also explained using examples.**

NOTE:

Only 0.5 mm² repair wires are available for repairing a 0.25 mm² wire.

Procedure

-- Free up the wire to be repaired at two places approximately 20 cm on both sides of the repair point.

CAUTION: Risk of damaging the electrical wires.

- **Expose wrapped wiring harnesses carefully.**

-- If necessary, removing the wiring harness wrapping using a knife.

-- Route yellow repair wire next to damaged wiring harness and cut repair wire to the required length using wire stripper VAS 1978/3.

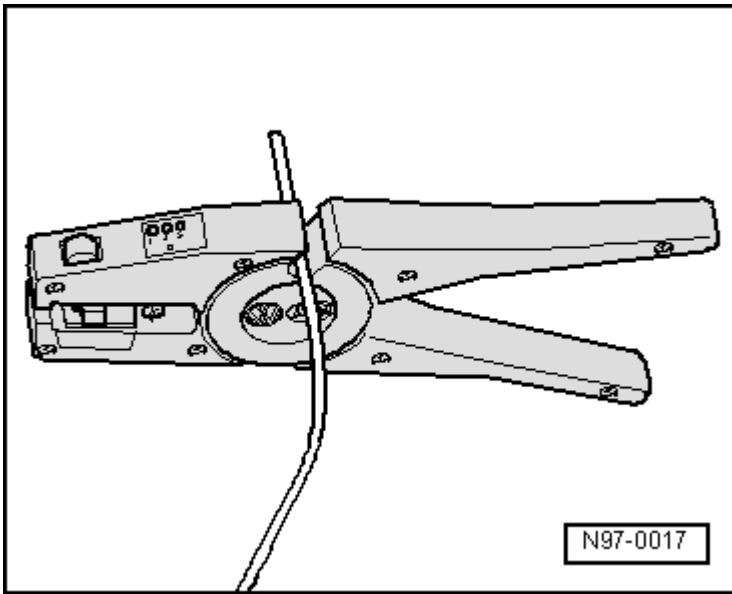


Fig. 79: Cutting Wire

Courtesy of AUDI OF AMERICA, LLC

- Cut damaged wire section from the vehicle-specific single wire.
- Adjust the sliding stop in the VAS 1978/3 jaws to 12 to 14 mm for the wire to be stripped.

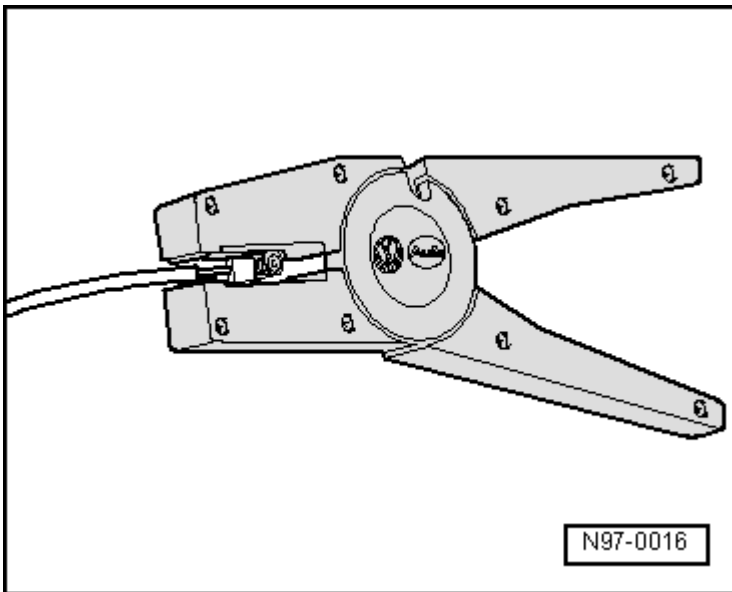


Fig. 80: Identifying Stripping Pliers To Strip Wiring Insulation

Courtesy of AUDI OF AMERICA, LLC

- Insert the vehicle-specific single wire end from the front into the pliers jaws as far as the stop and squeeze the pliers together completely.
- Open pliers again and remove the stripped wire end.

- Twist bare strands one-half turn.
- Repeat the procedure on the other end of the vehicle-specific individual wire.
- Adjust the sliding stop in the VAS 1978/3 jaws to 6 to 7 mm for the wire to be stripped.

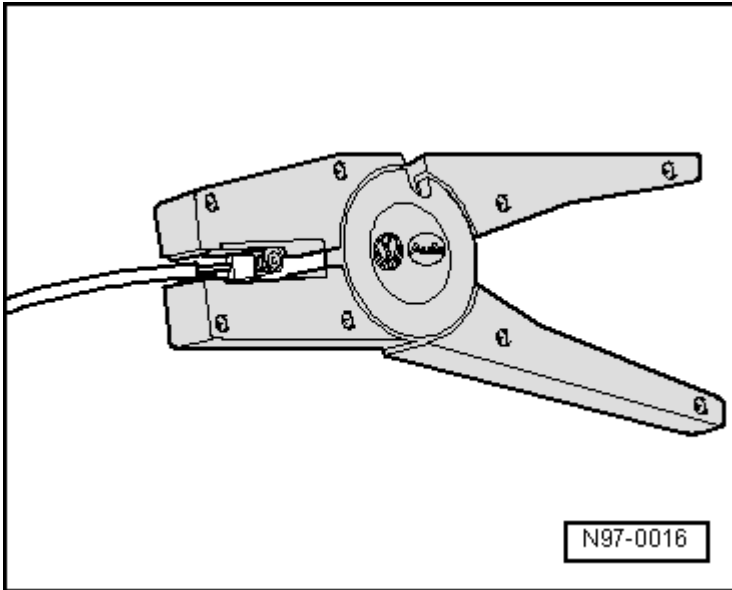


Fig. 81: Identifying Stripping Pliers To Strip Wiring Insulation
Courtesy of AUDI OF AMERICA, LLC

- Insert the yellow repair wire end from the front into the pliers jaws as far as the stop and squeeze the pliers together completely.
- Open pliers again and remove the stripped wire end.
- Repeat this procedure on the other repair wire end.
- For the repair of a 0.25 mm² wire, use a small yellow crimp connector from the VAS 1978 B.
- Use VAS 1978 B crimping pliers (base tool) VAS 1978/1-2 with exchangeable head, 0.35 mm² - 2.5 mm² VAS 1978/1-1 to crimp the connector.

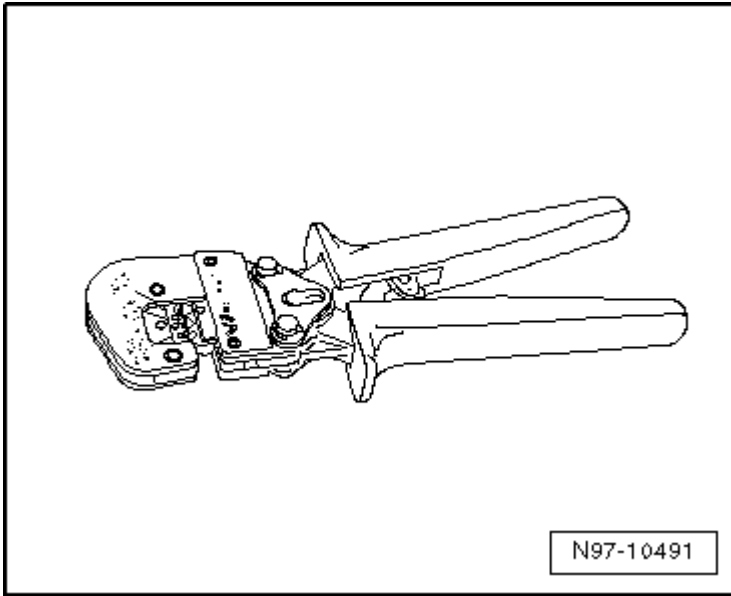


Fig. 82: Crimping Pliers

Courtesy of AUDI OF AMERICA, LLC

-- Slide the small yellow crimp connector onto the vehicle-specific single wire at one side and onto the repair wire at the other side.

-- Crimp the crimp connection at both wire ends using crimp pliers.

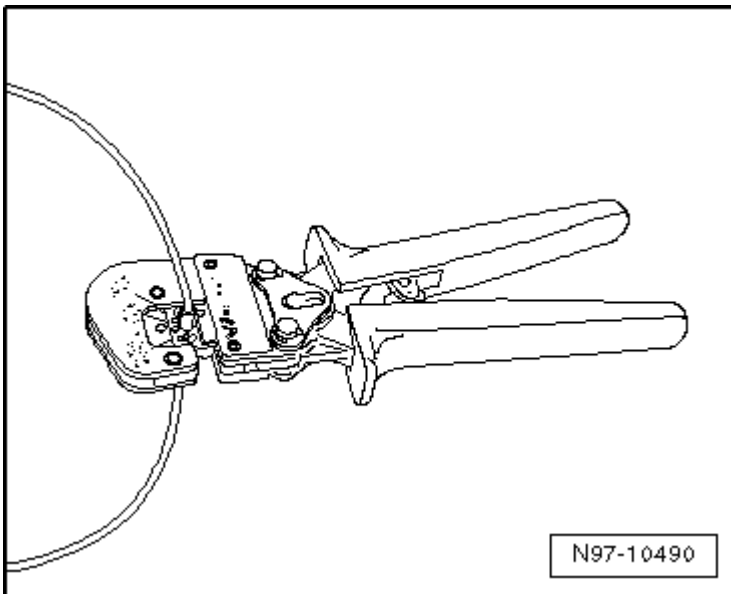


Fig. 83: Crimping A Single Break Point

Courtesy of AUDI OF AMERICA, LLC

-- Repeat this procedure at the other repair wire end.

NOTE: **Do not crimp wire insulation.**

After crimping, crimp connections must be heat-shrunk using hot air gun to prevent moisture penetration.

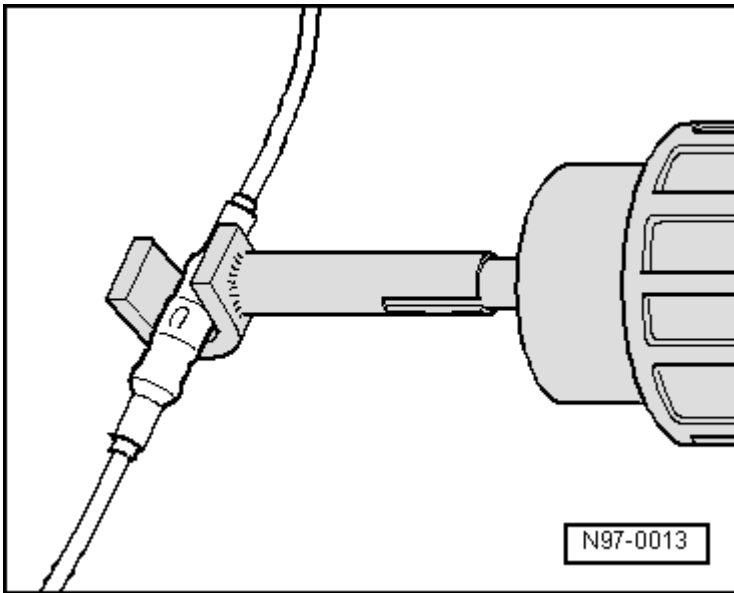


Fig. 84: Heating Crimp Connection Using Hot Air Gun
Courtesy of AUDI OF AMERICA, LLC

-- Place the shrink element for hot air blower VAS 1978/15A on the hot air blower VAS 1978/14A.

CAUTION: Risk of damaging surrounding components.

- When heat-shrinking crimp connections, be careful not to damage any other wiring, plastic parts or insulating material with the hot nozzle of the hot air blower.
- Always observe operating instructions of heat gun.

-- Heat crimp connection using the hot air blower lengthwise from center outward until it is sealed completely and adhesive comes out the ends.

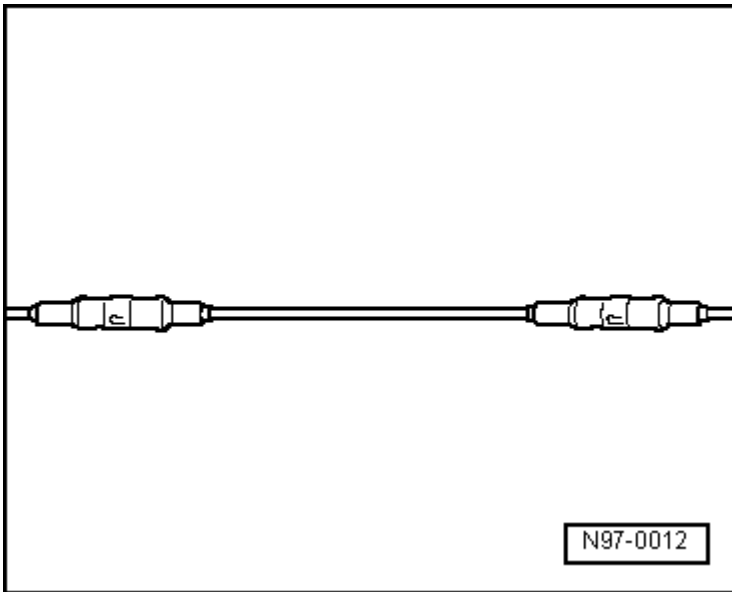


Fig. 85: Identifying Wire Break With Dual Repair Point
Courtesy of AUDI OF AMERICA, LLC

- This is how the completed repair location with the inserted wire and two crimp connectors should look.

NOTE:

- Make sure that crimp connections do not lie directly next to each other when several wires need to be repaired. Arrange the crimp connectors at a slight offset so that the circumference of the wiring harness does not become too large.

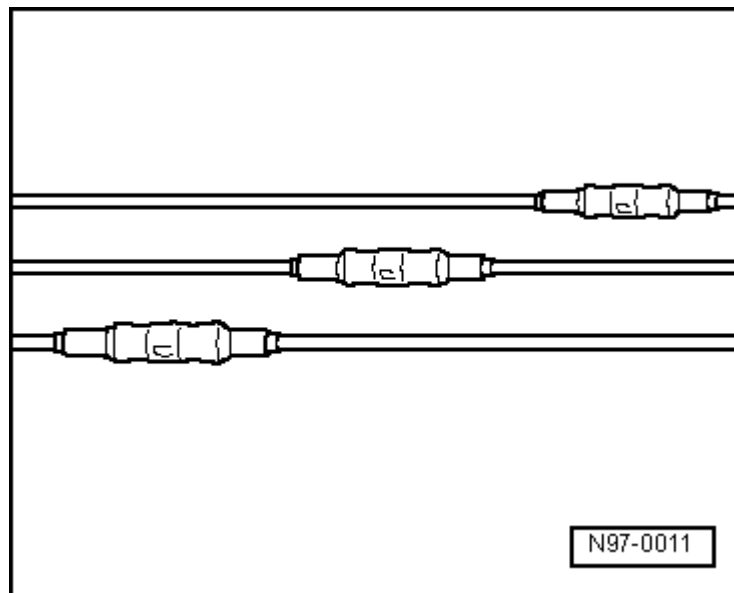


Fig. 86: Identifying Offset Positions Of Crimped Connections
Courtesy of AUDI OF AMERICA, LLC

- If the repair point was previous taped, this point must be taped again with

yellow insulating tape after repairs.

- **Secure the repaired wiring harness if necessary with a cable tie to prevent flapping noises while driving.**

0.35 MM 2 OR GREATER WITH INDIVIDUAL CRIMP CONNECTOR, REPAIRING

Special tools and workshop equipment required

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

CAUTION:

- **Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.**
- **Observe the country-specific requirements.**

NOTE:

- **Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.**
- **Repairs on open circuits and faulty connectors are also explained using examples.**

Procedure

-- Free up the wire to be repaired approximately 20 cm on both sides of the repair point.

CAUTION: Risk of damaging the electrical wires.

- **Expose wrapped wiring harnesses carefully.**

-- If necessary, removing the wiring harness wrapping using a knife.

-- Cut out the damaged wire section using wire stripper VAS 1978/3.

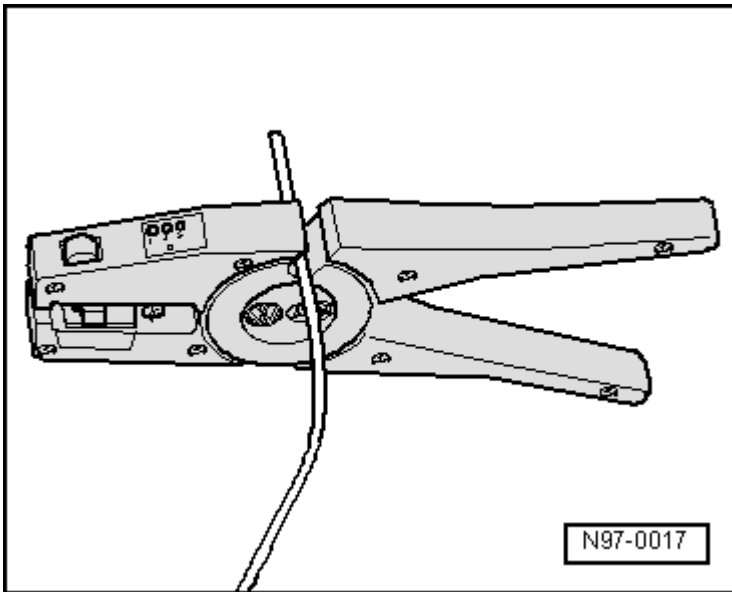


Fig. 87: Cutting Wire

Courtesy of AUDI OF AMERICA, LLC

NOTE: If, by cutting out the damaged wire section, both ends of the vehicle-specific single wire are too short for a repair using a single crimp connector, insert a repair wire section of matching length with two crimp connections. Refer to 0.35 MM.

-- Adjust the sliding stop in the VAS 1978/3 jaws to 6 to 7 mm for the wire to be stripped.

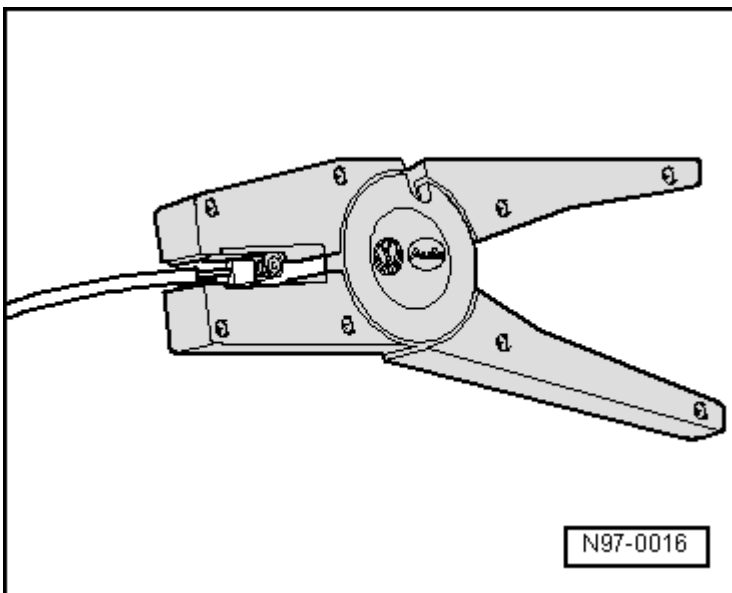


Fig. 88: Identifying Stripping Pliers To Strip Wiring Insulation

Courtesy of AUDI OF AMERICA, LLC

-- Insert wire end from front up to stop into jaws of pliers and squeeze the pliers completely.

- Open pliers again and remove the stripped wire end.
- For the repair, use a suitable crimp connector from the VAS 1978 B.
- Use the crimping pliers (base tool) VAS 1978/1-2 to press the crimp connector.

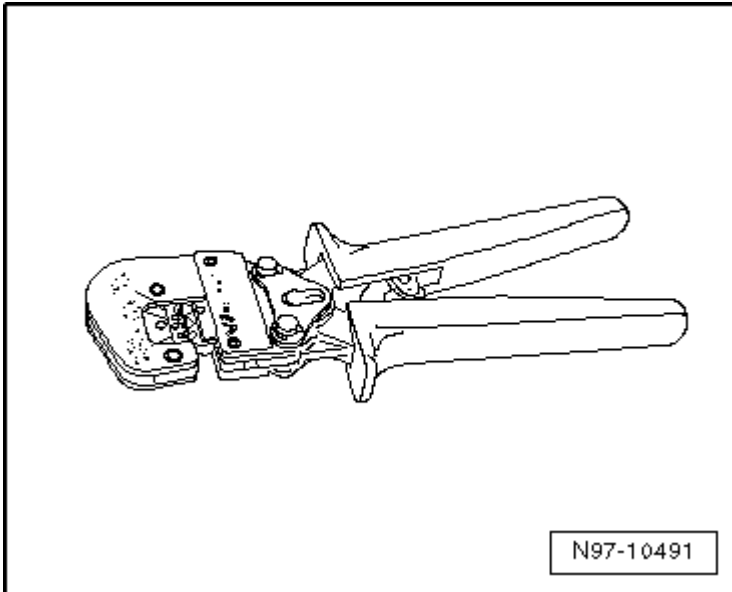


Fig. 89: Crimping Pliers

Courtesy of AUDI OF AMERICA, LLC

The following exchangeable heads are available for the VAS 1978/1-2:

- Exchange head, 0, 35 mm² - 2, 5 mm² VAS 1978/1-1
- Exchangeable head, 4.0-6.0 mm² VAS 1978/2 A

-- Slide crimp connection onto both stripped wire ends of vehicle-specific single wire and crimp them using crimp pliers.

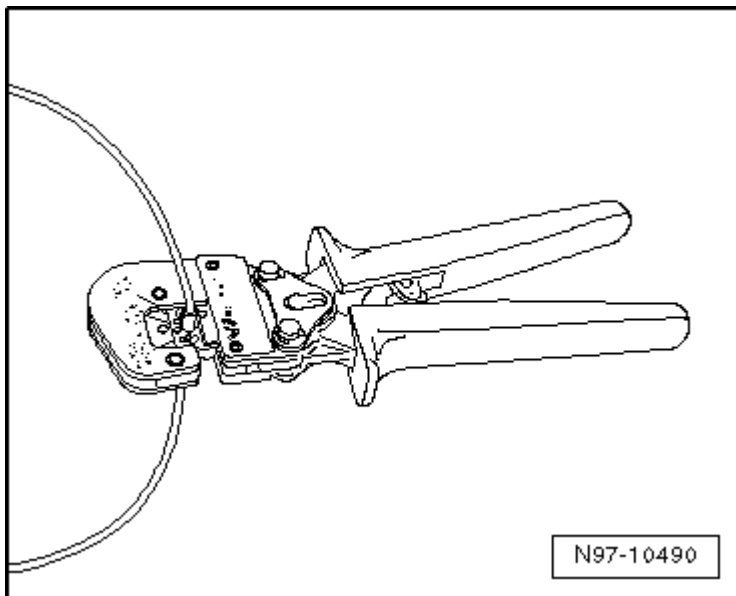


Fig. 90: Crimping A Single Break Point

Courtesy of AUDI OF AMERICA, LLC

NOTE: Do not crimp wire insulation.

After crimping, crimp connections must be heat-shrunk using hot air gun to prevent moisture penetration.

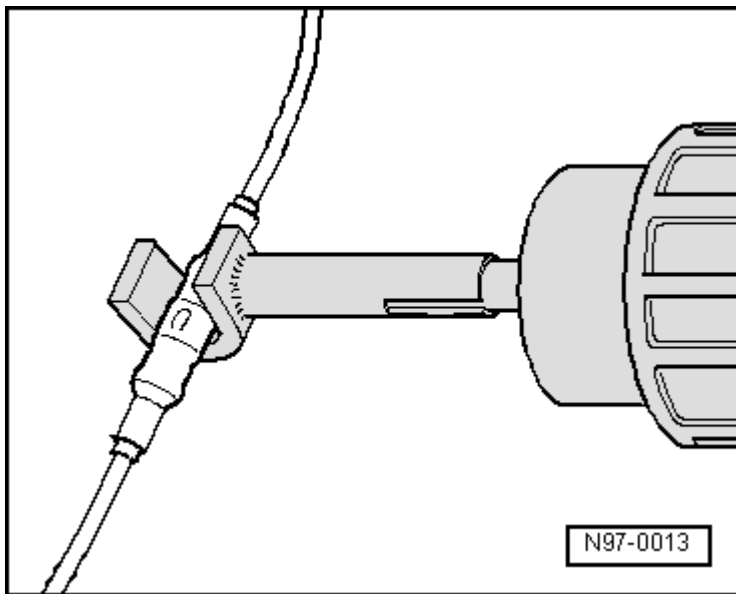


Fig. 91: Heating Crimp Connection Using Hot Air Gun

Courtesy of AUDI OF AMERICA, LLC

-- Place the shrink element for hot air blower VAS 1978/15A on the hot air blower VAS 1978/14A.

CAUTION: Risk of damaging surrounding components.

- When heat-shrinking crimp connections, be careful not to damage any other wiring, plastic parts or insulating material with the hot nozzle of the hot air blower.
- Always observe operating instructions of heat gun.

-- Heat crimp connection using the hot air blower lengthwise from center outward until it is sealed completely and adhesive comes out the ends.

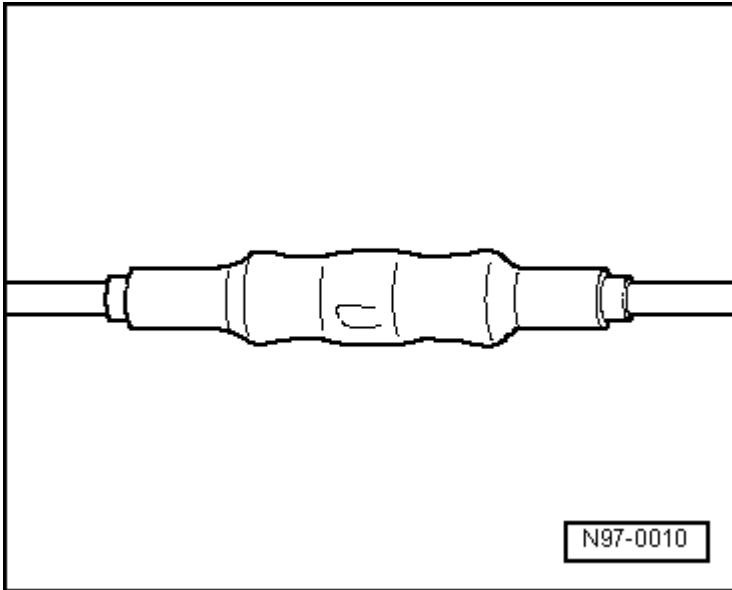


Fig. 92: Identifying Single Repair Point
Courtesy of AUDI OF AMERICA, LLC

- This is how the completed repair location with individual crimp connector should appear.

NOTE:

- Make sure that crimp connections do not lie directly next to each other when several wires need to be repaired. Arrange the crimp connectors at a slight offset so that the circumference of the wiring harness does not become too large.

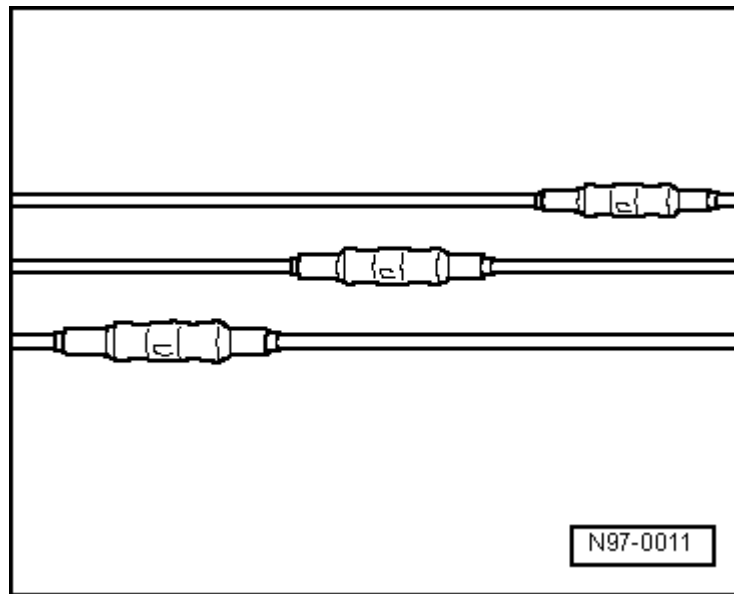


Fig. 93: Identifying Offset Positions Of Crimped Connections
Courtesy of AUDI OF AMERICA, LLC

- If the repair point was previously taped, this point must be taped again with yellow insulating tape after repairs.
- Secure the repaired wiring harness if necessary with a cable tie to prevent flapping noises while driving.

0.35 MM² OR GREATER WITH INTERMEDIATE WIRE SECTION, REPAIRING

Special tools and workshop equipment required

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

CAUTION:

- Repairs to the wiring harnesses and connectors must only be performed using the Wiring harness repair set VAS 1978 B.
- Observe the country-specific requirements.

NOTE:

- Use of the Wiring harness repair set VAS 1978 B is described in detail in the attached operating instructions.
- Repairs on open circuits and faulty connectors are also explained using examples.

NOTE:

Only 0.5 mm² repair wires are available for repairing a 0.35 mm² wire.

Procedure

-- Free up the wire to be repaired at two places approximately 20 cm on both sides of the repair point.

CAUTION: Risk of damaging the electrical wires.

- **Expose wrapped wiring harnesses carefully.**

-- If necessary, removing the wiring harness wrapping using a knife.

-- Route yellow repair wire next to damaged wiring harness and cut repair wire to the required length using wire stripper VAS 1978/3.

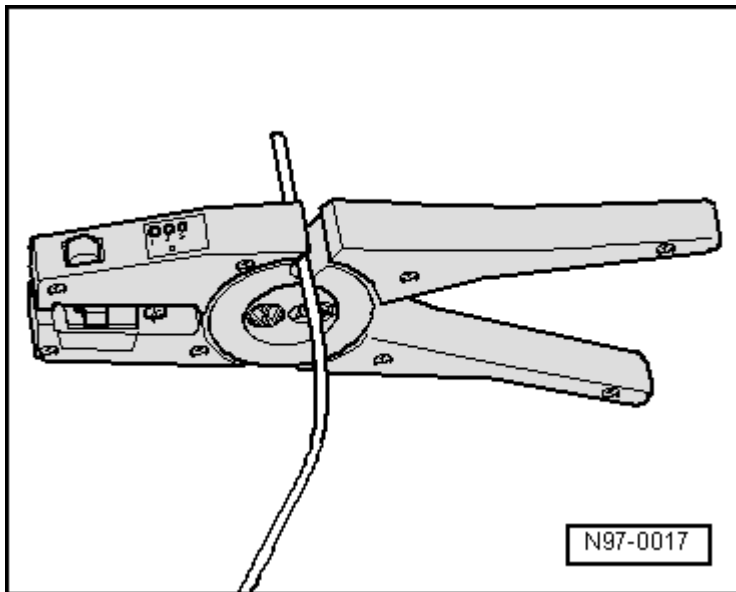


Fig. 94: Cutting Wire

Courtesy of AUDI OF AMERICA, LLC

-- Cut damaged wire section from the vehicle-specific single wire.

-- Adjust the sliding stop in the VAS 1978/3 jaws to 6 to 7 mm for the wire to be stripped.

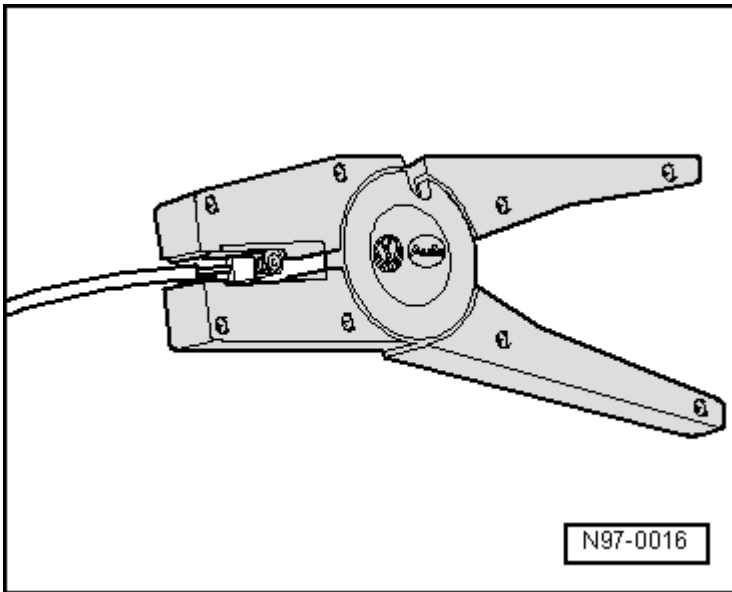


Fig. 95: Identifying Stripping Pliers To Strip Wiring Insulation
Courtesy of AUDI OF AMERICA, LLC

- Insert the vehicle-specific single wire end from the front into the pliers jaws as far as the stop and squeeze the pliers together completely.
- Open pliers again and remove the stripped wire end.
- Repeat the procedure on the other end of the vehicle-specific individual wire.
- For the repair, use two suitable crimp connectors from the VAS 1978 B.
- Use the crimping pliers (base tool) VAS 1978/1-2 to press the crimp connector.

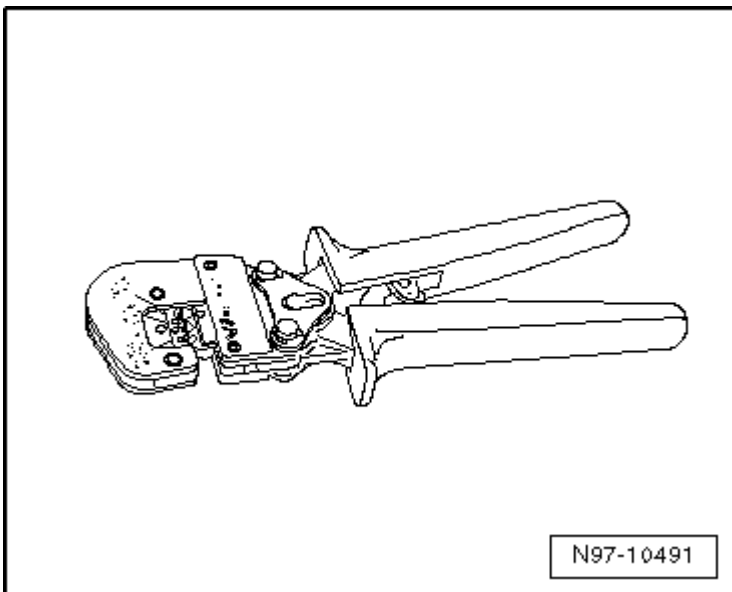


Fig. 96: Crimping Pliers

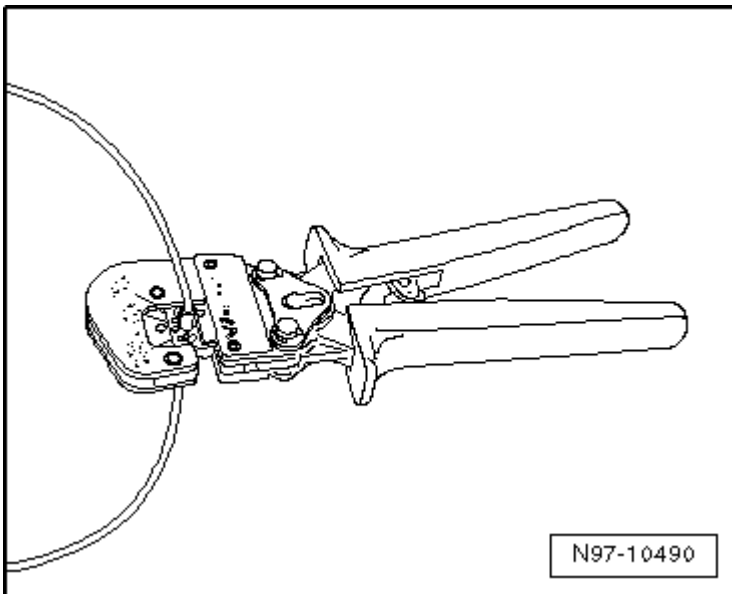
Courtesy of AUDI OF AMERICA, LLC

The following exchangeable heads are available for the VAS 1978/1-2:

- Exchange head, 0,35 mm² - 2,5 mm² VAS 1978/1-1
- Exchangeable head, 4.0-6.0 mm² VAS 1978/2 A

-- Slide the crimp connector onto the vehicle-specific single wire at one side and onto repair wire at the other side.

-- Crimp the crimp connection at both wire ends using crimp pliers.

**Fig. 97: Crimping A Single Break Point**

Courtesy of AUDI OF AMERICA, LLC

-- Repeat this procedure on the other wire ends.

NOTE: **Do not crimp wire insulation.**

After crimping, crimp connections must be heat-shrunk using hot air gun to prevent moisture penetration.

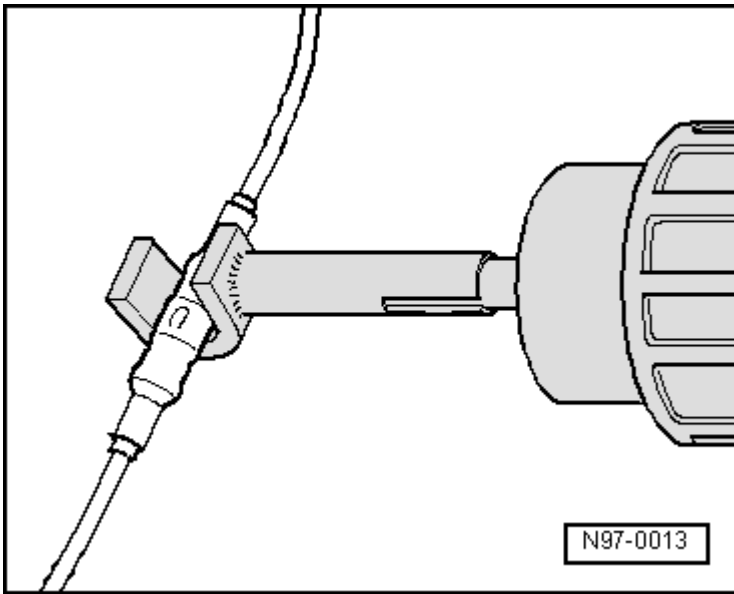


Fig. 98: Heating Crimp Connection Using Hot Air Gun
Courtesy of AUDI OF AMERICA, LLC

-- Place the shrink element for hot air blower VAS 1978/15A on the hot air blower VAS 1978/14A.

CAUTION: Risk of damaging surrounding components.

- When heat-shrinking crimp connections, be careful not to damage any other wiring, plastic parts or insulating material with the hot nozzle of the hot air blower.
- Always observe operating instructions of heat gun.

-- Heat crimp connection using the hot air blower lengthwise from center outward until it is sealed completely and adhesive comes out the ends.

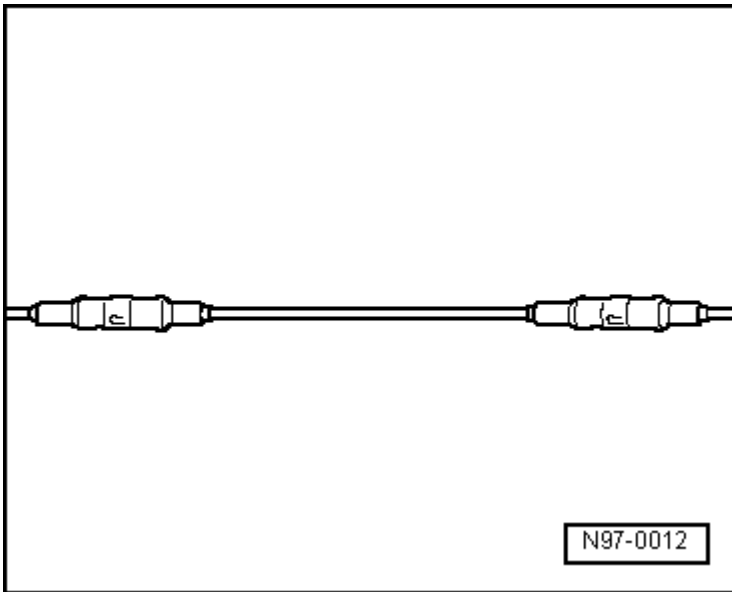


Fig. 99: Identifying Wire Break With Dual Repair Point
Courtesy of AUDI OF AMERICA, LLC

- This is how the completed repair location with the inserted wire and two crimp connectors should look.

NOTE:

- Make sure that crimp connections do not lie directly next to each other when several wires need to be repaired. Arrange the crimp connectors at a slight offset so that the circumference of the wiring harness does not become too large.

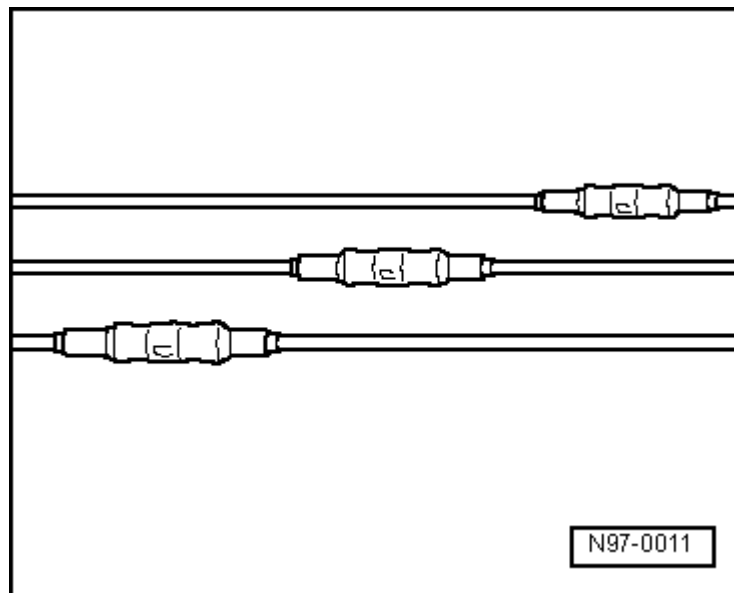


Fig. 100: Identifying Offset Positions Of Crimped Connections
Courtesy of AUDI OF AMERICA, LLC

- If the repair point was previous taped, this point must be taped again with

yellow insulating tape after repairs.

- Secure the repaired wiring harness if necessary with a cable tie to prevent flapping noises while driving.

SPECIAL TOOLS

- Wiring Harness Repair Set VAS 1978/A VAS 1978 B

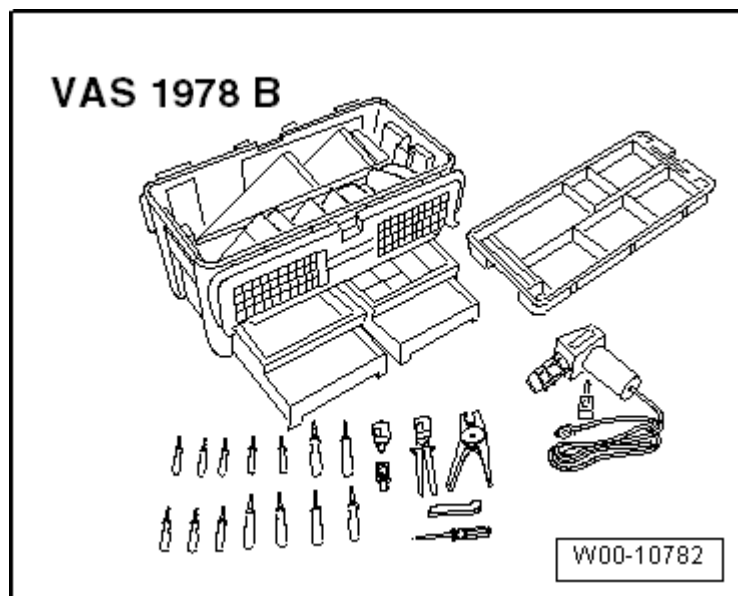


Fig. 101: Identifying VAS 1978 B
Courtesy of AUDI OF AMERICA, LLC

- Fiber Optic Pliers Repair Set VAS 6223



Fig. 102: Identifying Fiber Optic Plier Repair Set VAS 6223

Courtesy of AUDI OF AMERICA, LLC

- Fiber Optic Pliers Repair Set VAS 6223A

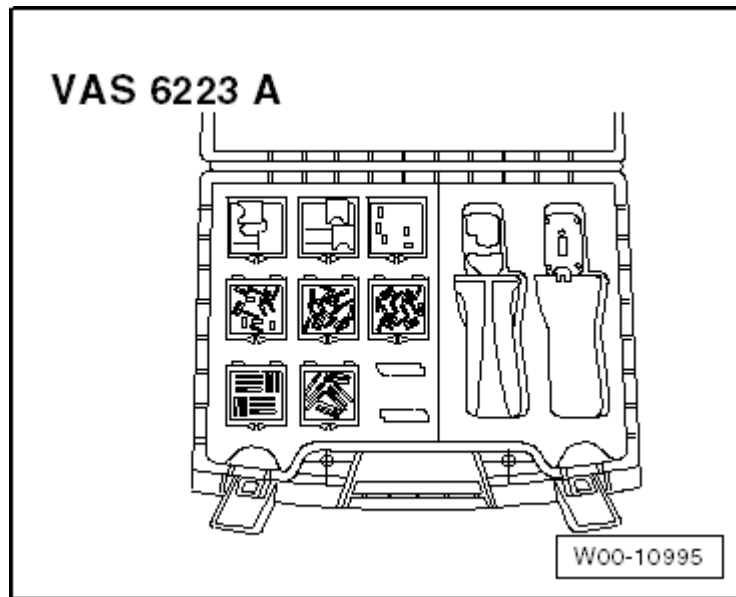


Fig. 103: Identifying Fiber Optic Pliers Repair Set - VAS 6223A-

Courtesy of AUDI OF AMERICA, LLC

- Air Hose Pliers VAS 6228

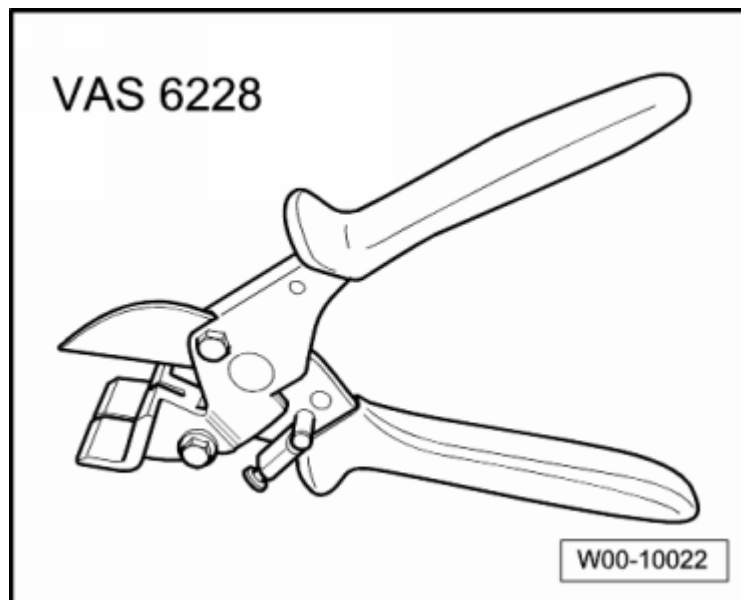


Fig. 104: Identifying Air Hose Pliers VAS 6228

Courtesy of AUDI OF AMERICA, LLC

- Contact Surfaces Cleaning Set VAS 6410

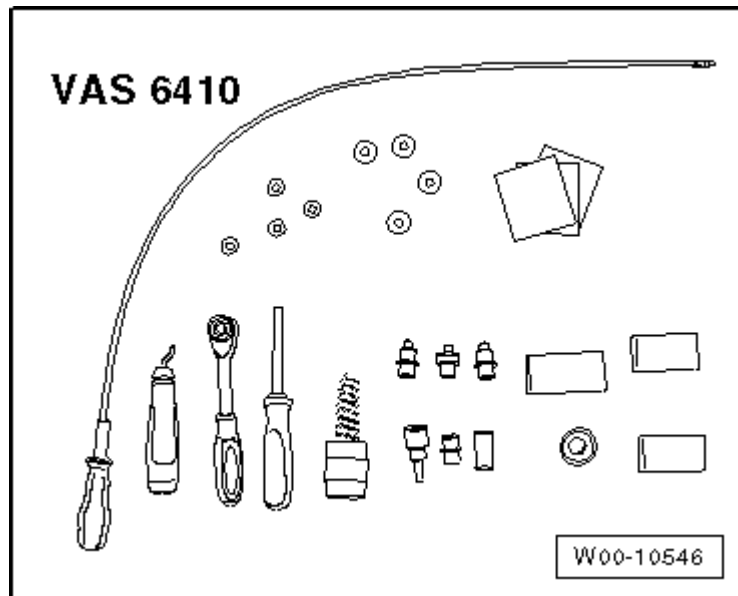


Fig. 105: Identifying Repair Set VAS 6410
Courtesy of AUDI OF AMERICA, LLC

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