Workshop Manual

Q6 e-tron 2024 ➤
Q4 e-tron 2022 ➤
e-tron/ Q8 e-tron 2019 ➤
e-tron GT 2022 ➤

Electrical system – General information

Edition 04.2024

List of Workshop Manual Repair Groups

Repair Group

27 - Starter, current supply, CCS
92 - Windscreen wash/wipe system
96 - Lights, bulbs, switches - interior
97 - Wiring

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

Contents

27 – Starter, current supply, CCS

1 Battery

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1.1 Checking 12V battery

Special tools and workshop equipment required

- battery tester with printer - VAS 6161-

Quick selection

Open-circuit voltage check

Important

- On vehicles that have been stationary or stored for longer periods, the battery must not have been charged or discharged for at least 2 days before the test.

– Check battery's open-circuit voltage using a multimeter.

Test result

Determined open-circuit voltage	Battery charge level	Required measures
Greater than or equal to 12.5 V	Charged	None
12.5 V – 11.6 V	Discharged	Charge battery ⇒ Rep. gr. 27 ; Charging battery
Smaller than or equal to 11.6 V	Totally discharged	Renew battery ⇒ Electrical system; Rep. gr. 27 ; Battery, 12 V; Removing and installing battery .

Battery check with magic eye

– Check battery housing and battery terminals are undamaged and battery is seated securely.

– Make sure that hose for central gas venting system is attached on negative terminal side and sealing plugs are attached on positive terminal side.

– Tap colour indicator lightly and carefully with handle of a screwdriver to improve accuracy of colour indicator.
– Carry out visual check of colour indicator.

Important

- Do not use a torch.
- Look at the colour indicator vertically from above.
- Black = electrolyte level is OK.
- Light yellow = electrolyte level is too low.

– If electrolyte level is too low, renew battery.

Battery check with vehicle diagnostic tester

– Check battery housing and battery terminals are undamaged and battery is seated securely.
– Make sure that hose for central gas venting system is attached on negative terminal side and sealing plugs are attached on positive terminal side.

Important

- Battery charger not connected.
- Battery connected.
- Battery temperature must be at least +10°C.
- ⇒ Vehicle diagnostic tester must be connected.

– Select tester path for battery check ⇒ Electrical system; Rep. gr. 00 ; Electrical components; Starting diagnosis .

Battery check with battery tester, vehicles without battery monitor

– Check battery housing and battery terminals are undamaged and battery is seated securely.
– Make sure that hose for central gas venting system is attached on negative terminal side and sealing plugs are attached on positive terminal side.

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1. Perform battery check using battery tester with printer - VAS 6161- .

Important

- Observe ⇒ Operating manual of battery tester .

1.2 Charging battery

1.2.1 Charging battery

WARNING

Risk of explosion due to a totally discharged battery. Risk of serious injuries.

– Do not charge or attempt to jump start a totally discharged battery.

– Renew battery.

Note

When charging the battery, it should ideally be installed in the vehicle and connected.

Important

- Battery temperature must be at least 10°C.
- Observe ⇒ operating instructions for battery charger .

Procedure

– ⇒ Rep. gr. 27 ; Checking 12V battery

Vehicles with “wet” or “EFB+” batteries:

– Observe result of battery check.

Battery charge level	Maximum charging current
Open-circuit voltage < 12.2 V	55 A
Open-circuit voltage > 12.2 V	No limitation

Note

If the battery charge level of “wet” or “EFB+” batteries (“AGM ”batteries not included) is poor, electrolyte levels may increase due to excessive charging currents. This can lead to electrolyte escaping through the gas vent.

All vehicles (continued)

Vehicle key and other drive authorisation systems (e.g. smartphone) must be deposited outside vehicle.

– Switch off ignition.

Continued

Vehicles with battery located in interior:

Batteries may be charged via the jump-start connection point with a maximum current of 50 A.

All vehicles (continued)

– Connect red charger clamp (+) to positive battery terminal or remote positive terminal.

– Connect black charger clamp (–) to remote earth terminal.

– Switch battery charger on and start charging process.

– When battery charge level has reached 100 %, end charging process and disconnect battery charger.

1.2.2 Service charging

Note

When charging the battery, it should ideally be installed in the vehicle and connected.

The battery charger ensures the battery is charged correctly and maintains its charge:

- During diagnosis and service work
- During software updates
- During flashing campaigns
- In showroom mode

Maintenance charging can be continued for an unlimited period.

Important

- A battery charger with a minimum charging current of 70 A must be used for software updates. A battery charger with a minimum charging current of 100 A must be used for flashing campaigns.
- Battery temperature must be at least 10°C.
- Observe ⇒ operating instructions for battery charger .

Procedure

Vehicle key and other drive authorisation systems (e.g. smartphone) must be deposited outside vehicle.

– Switch off ignition.

Continued

Vehicles with battery located in interior:

Batteries may be charged via the jump-start connection point with a maximum current of 50 A.

All vehicles (continued)

– Connect red charger clamp (+) to positive battery terminal or remote positive terminal.
– Connect black charger clamp (–) to remote earth terminal.
– Switch battery charger on and start charging process.

– After completing service work, end charging process and disconnect battery charger.

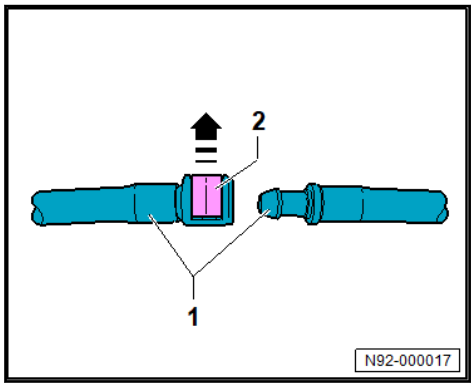
92 – Windscreen wash/wipe system

1 Washer fluid lines

1.1 Pulling off and fitting washer fluid hoses

Pulling off

– Release securing clip -2- in direction of -arrow-.
– Disconnect washer fluid hoses -1-.



Fitting

Install in reverse order of removal.

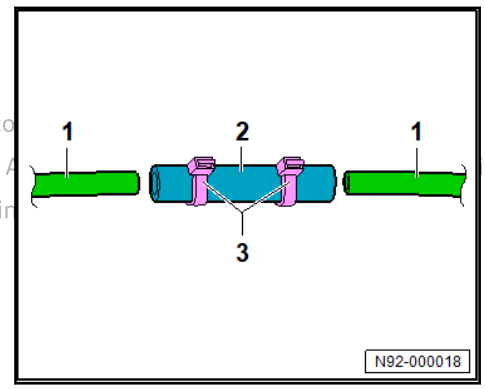
1.2 Repairing smooth tube

Repairs are carried out on smooth tubes with diameters of 5 mm and 6 mm and a hose thickness of 2 mm, using an EPDM tube ⇒ Electronic parts catalogue (ETKA) .

Installing

– Cut out damaged section with straight cuts.

– Cut EPDM hose -2- to required length.
– Insert ends of smooth tube -1- 10 mm into EPDM hose -2-.
– Secure EPDM hose -2- with cable ties -3-.



1.3 Repairing corrugated tube

Special tools and workshop equipment required

- hot air blower - VAS 1978/14A-
- shrink element for hot air blower - VAS 1978/15A-

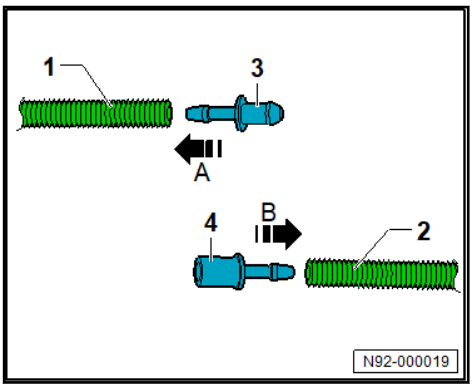
Important

- Do not strain the repair point with tension or bending load.
- If the damaged section is longer than 20 mm, a new piece of corrugated tube must be installed ⇒ Electronic parts catalogue (ETKA) , and the repair must be carried out twice.

Installing

– Cut out damaged section with straight cuts.

– Slide a 20 mm heat-shrink hose onto corrugated tube -1- and -2-.
– Using hot air blower - VAS 1978/14A- and shrink element for hot air blower - VAS 1978/15A- , apply heat to end of corrugated tube -1-.
– Press coupling piece -3- ⇒ Electronic parts catalogue (ETKA) in direction of -arrow A- into corrugated tube -1-.
– Using hot air blower and shrink element for hot air blower, apply heat to end of corrugated tube -2-.
– Press coupling piece -4- ⇒ Electronic parts catalogue (ETKA) in direction of -arrow B- into corrugated tube -2-.
– Fit coupling pieces -3- and -4-.
– Secure end of corrugated tube -1- and -2- to hot air blower and shrink element through heat-shrink hose.



96 – Lights, bulbs, switches - interior

1 Immobiliser

1.1 Defective transponder or loss of key

The transponder is integrated into the ignition key and cannot be renewed separately.

The complete ignition key or sender unit must be renewed if the transponder is defective.

Perform the following function in the “Offboard Diagnostic Information System Service” depending on the immobiliser generation:

- “Servicing immobilizer.”
- “Vehicle Security, initial operation (Immobilizer, Component Protection, Vehicle Key Management System (VKMS))”

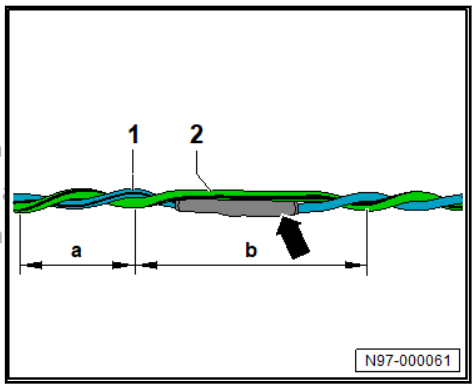
97 – Wiring

1 Wires and lines

1.1 Repairing wiring harnesses

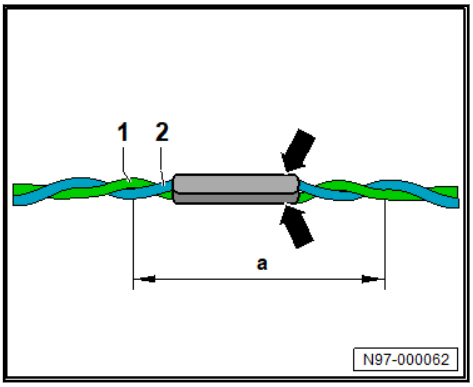
1.1.1 Repair instructions for airbag and belt tensioner wiring

- Repairs may be carried out on a maximum of 2 repair positions.
- Crimp connectors must be shrink-fitted.
- Do not introduce the repaired wiring back into the wiring harness.
- Mark the repair position clearly with yellow insulating tape.
- Carry out repairs at a maximum distance of 30 cm from the connector housing.
- Wires leading to airbags and igniters are twisted with a lay length of 20 ± 5 mm. The lay length must be considered during repair work.
- Both wires must have the same length for repairs. When wires -1- and -2- are twisted, the lay length of -a- = 20 mm ± 5 must be adhered to without fail.
- No section of the wire -arrow- may be longer than dimension -b- = 100 mm without a twist.

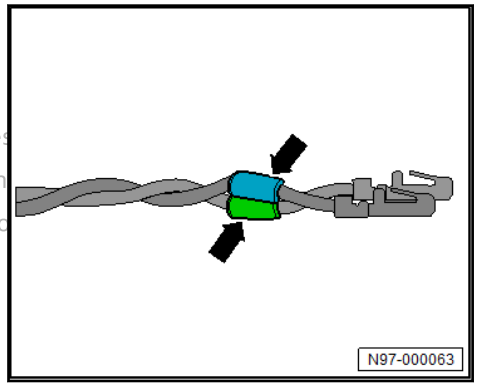


1.1.2 Repair instructions for CAN bus wires

- Unshielded, twisted-pair lines -1- and -2- with a cross section of 0.13 mm² or 0.35 mm² are used for CAN bus wiring.
- Both CAN bus wires must have the same length.
- It is not permitted to repair the individual cores.
- Repairs to CAN bus wires must be carried out observing the correct cross section and, if possible, the corresponding colour coding; allocation ⇒ Electronic parts catalogue (ETKA) .
- It is important to make sure that the length of the CAN wires after repairs does not deviate by more than ±50 mm from the original wire length.
- No section of the wire -arrows- may be longer than dimension -a- = 100 mm without a twist.
- Mark the area of repair with yellow insulation tape to make it easy to identify.

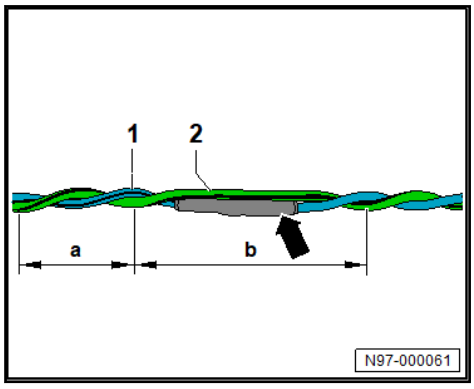


- Crimping of wires with connectors is to be carried out according to the same procedure.
- The repair areas -arrows- may be above one another.
- For colour codes of CAN bus wires, refer to the current flow diagram. ⇒ Current flow diagrams, Electrical fault finding and Fitting locations
- Cable tails with connectors must be crimped in accordance with the repair instructions given above.



1.1.3 Repair notes on FlexRay wires

A twisted two-core sheathed cable or an unsheathed, twisted two-core cable -1- and -2- with a cross section of 0.35 mm^2 is used as a FlexRay wire.



- Repairs are only permissible for specific wires from ⇒ Electronic parts catalogue (ETKA) .
- Both cores must be of same length.
- Mark the repair position, e.g. with yellow insulating tape.
- When repairing both cores, same specifications apply as for repairs to a single core.

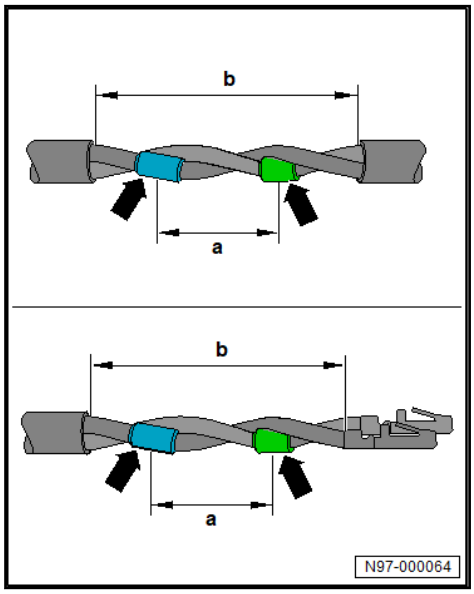
Sheathed wires:

When twisting the wires -1- and -2-, the lay length dimension -a- = 30 mm must be considered.

No section of the wire may be longer than dimension -b- = 50 mm without a twist -arrow-.

Important

- The maximum wire length with the sheath removed corresponds to dimension -b- = 100 mm.
- Protect repair location with a heat-shrink hose. Wrap waterproof insulating tape around the stripped wire.
- In addition, both repair locations -arrows- must be arranged offset relative to one another by one lay length dimension -a- = 30 mm.
- Crimping of wires with connectors must be carried out according to the same procedure.



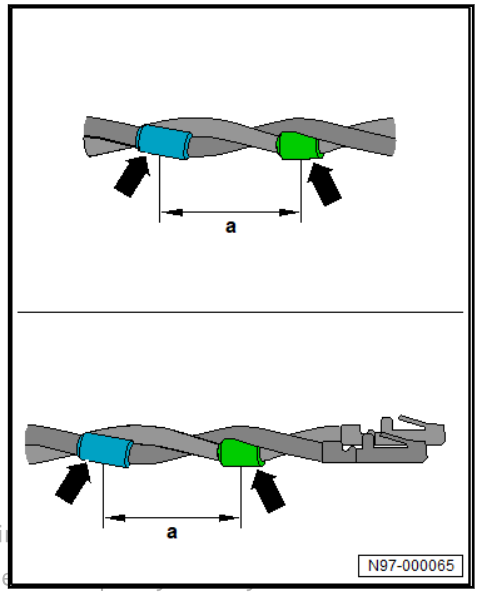
Wires without sheathing:

When twisting the wires -1- and -2-, the lay length dimension -a- = 20 mm must be considered.

No section of the wire may be longer than dimension -b- = 40 mm without a twist -arrow-.

Important

- In addition, both repair locations must be arranged offset relative to one another by one lay length dimension -a- = 20 mm.
- Crimping of wires with connectors must be carried out according to the same procedure.



1.1.4 Repairing 0.13 mm² - 6 mm² wire

Special tools and workshop equipment required

- ♦ crimping pliers - VAS 1978/1-2-
- ♦ head adapter for crimping pliers 0.35 – 2.5 mm² - VAS 1978/1-1-
- ♦ head adapter for crimping pliers 4.0 – 6.0 mm² - VAS 1978/2A-
- ♦ hot air blower - VAS 1978/14A-
- ♦ interchangeable head for crimping pliers 0.13 – 0.5 mm² - VAS 1978/1-3-
- ♦ shrink element for hot air blower - VAS 1978/15A-

– Depending on the cross section of the respective wire, attach interchangeable head for crimping pliers 0.13 – 0.5 mm² - VAS 1978/1-3- , head adapter for crimping pliers 0.35 – 2.5 mm² - VAS 1978/1-1- or head adapter for crimping pliers 4.0 – 6.0 mm² - VAS 1978/2A- to crimping pliers - VAS 1978/1-2- .

– Cut out damaged section of wire.

Important

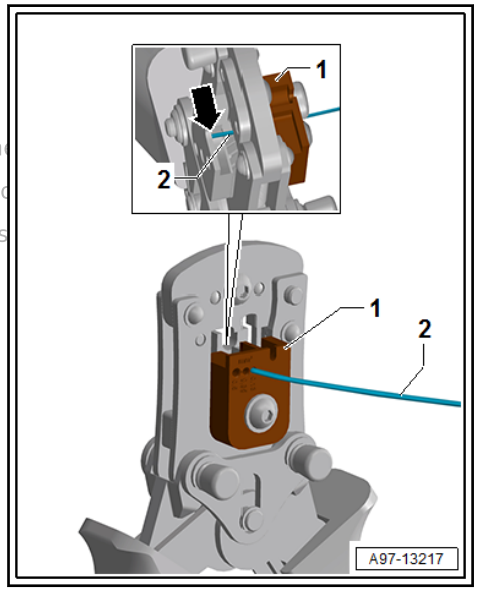
- If, after the damaged wire section has been cut out, both ends are too short for a repair using just one crimp connector, use a piece of yellow repair wire with 2 crimp connectors.

– Fit end of wire -2- as far as stop -arrow- in receiver on adapter head -1- with appropriate cross section.
– Press together crimping pliers, and hold it there.
– Pull out end of wire -2- from adapter head -1- to strip insulation.
– Open crimping pliers.

Important

- Insulation must be cut cleanly and removed from wire.
- Single wires must not be damaged.

– Strip end of other wire -2- in the same way.



0.13-mm² wires:

– Push heat-shrink hose ⇒ Electronic parts catalogue (ETKA) onto electrical wire.

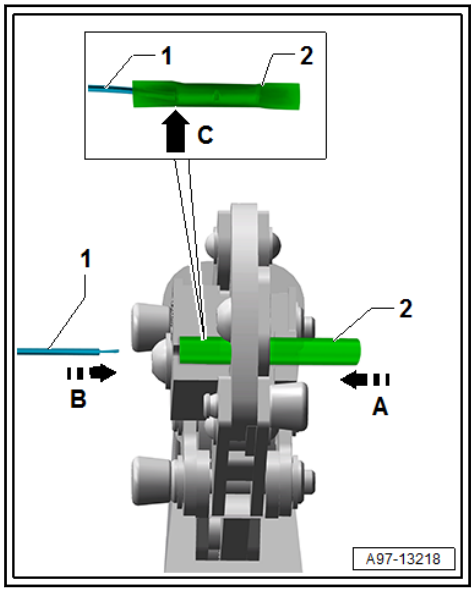
All vehicles (continued)

– Push crimp connector -2- in direction of -arrow A- as far as stop into crimp opening.
– Push stripped wire -1- in direction of -arrow B- into crimp connector -2-.

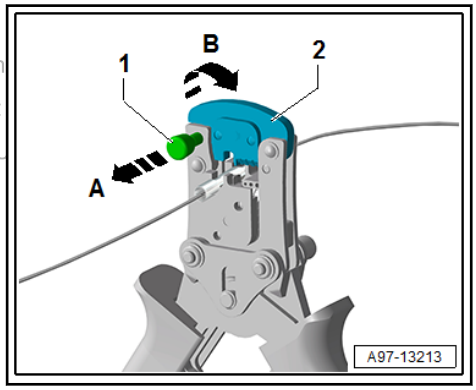
Important

- All single wires must be pushed into crimp connector -2-
- Insulation on wire -arrow C- must not be crimped.

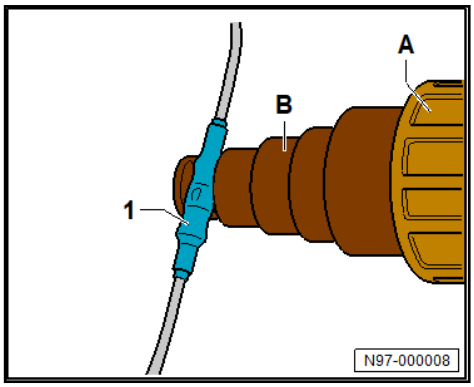
– Press together crimping pliers, then open them.
– Remove wire -1- with crimp connector -2-.
– Crimp wire -1- with crimp connector -2- on other side as described.



– Pull out locking pin -1- to stop in direction of -arrow A-.
– Swivel upper part of adapter head -2- in direction of -arrow B-.
– Removed crimped crimp connector.



– Shrink the crimp connector -1- using hot air blower - VAS 1978/14A- -A- and shrink element for hot air blower - VAS 1978/15A- -B-.



0.13-mm² wires:

– Push heat-shrink hose -1- centrally over crimp connector -2-.

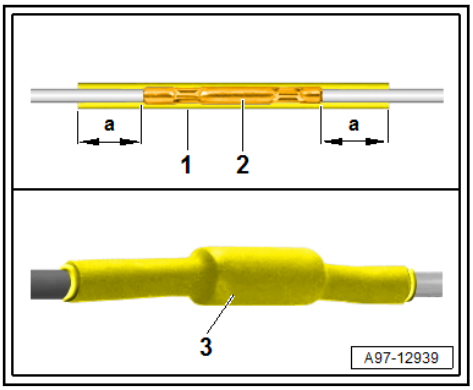
Important

- Dimension -a- must be even on both sides.

– Shrink heat-shrink hose -1- with hot air blower and shrink adapter from inside out.
– Inspect completed repair section -3-.

Important

- Heat-shrink hose -1- must be entirely shrunk.
- Adhesive must emerge from ends.

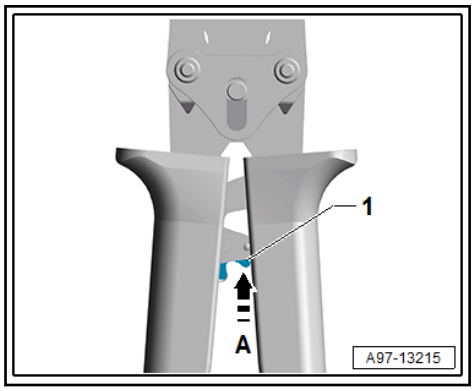


All vehicles (continued)

Premature release

– Release release lever -1- in direction of -arrow A-.

– At same time, press together crimping pliers slightly and then open.



1.1.5 Repairing wires with a cross section of 10 mm² or 16 mm²

Special tools and workshop equipment required

- hot air blower - VAS 1978/14A-
- shrink adapter for hot air blower - VAS 1978/15A-
- wiring harness repair set - VAS 631 003-

Removing

– Attach crimping anvil and crimping die matching the wire cross-section to crimping pliers from wiring harness repair set - VAS 631 003- .

– Cut out damaged section of wire.

Important

- If, after the damaged wire section has been cut out, both ends are too short for a repair using just one crimp connector, use a piece of yellow repair wire with 2 crimp connectors.

– Strip required length of electrical wires according to cross-section.

- 10 mm² wires: 14 mm
- 16 mm² wires: 16.5 mm

Important

- Insulation must be cut cleanly and removed from wire.
- Single wires must not be damaged.

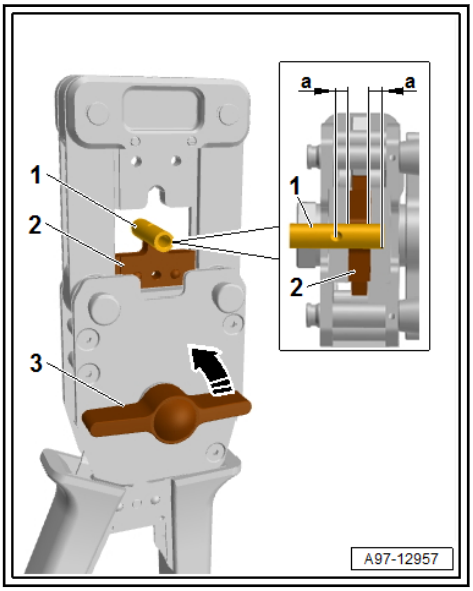
– Push heat-shrink hose onto one of the electrical wires ⇒ Electronic parts catalogue (ETKA) .

– Position crimp connector -1- with first crimping point centrally on crimping anvil -2-.

Important

- Dimension -a- must be the same.

– Turn quick-action lever -3- in direction of -arrow- until crimp connector -1- is fixed.



– Insert stripped end of electrical wire -2- in direction of -arrow- to stop into crimp connector -1-.

Important

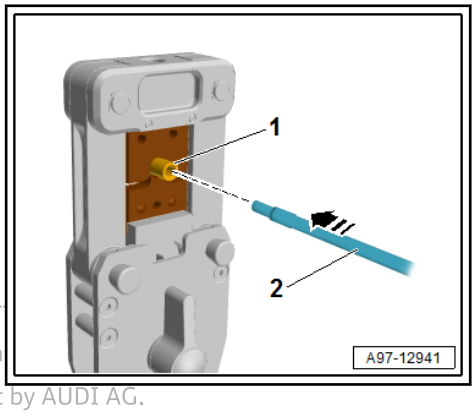
- All single wires must be pushed into crimp connector.

– Close and open crimping pliers several times until crimping anvil moves downwards automatically to start position.

Important

- Insulation on wire -2- must not be crimped.

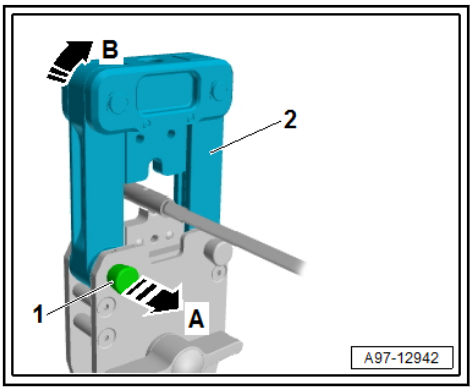
– Proceed in the same way to crimp electrical wire with crimp connector -1- on the other side.



– Pull out locking pin -1- in direction of arrow -A- as far as it will go.

– Open adapter -2- in direction of arrow -B-.

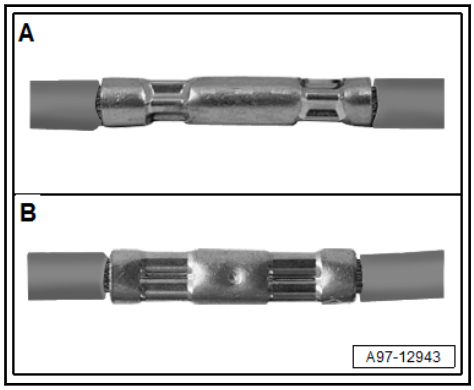
– Remove crimped crimp connector.



– Check crimped crimp connector.

♦ -A- – 10 mm², star-shaped crimp

♦ -B- – 16 mm², F-crimp



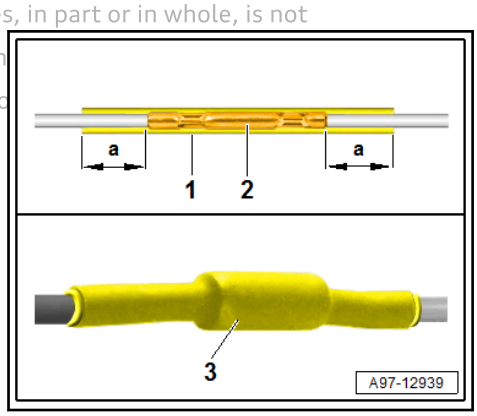
– Position heat-shrink hose -1- centrally over crimp connector -2-.

Important

• Dimension -a- must be even on both sides.

– Shrink heat-shrink hose -1- from inside outwards using hot air blower - VAS 1978/14A- and shrink adapter for hot air blower - VAS 1978/15A- .

– Inspect completed repair section -3-.



Important

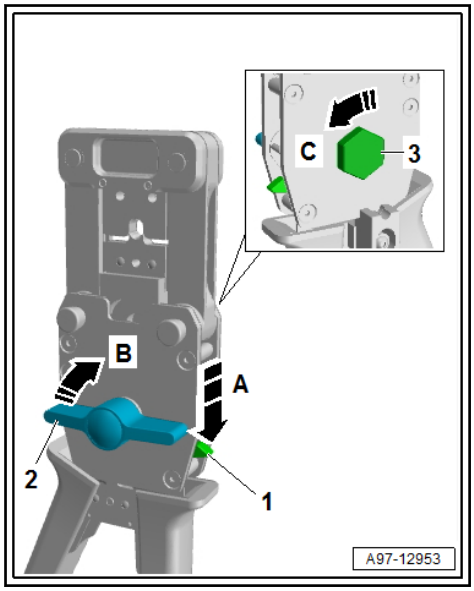
• The heat-shrink hose must be entirely shrunk.

• Adhesive must emerge from ends.

Premature release

– Release release lever -1- in direction of -arrow A-.

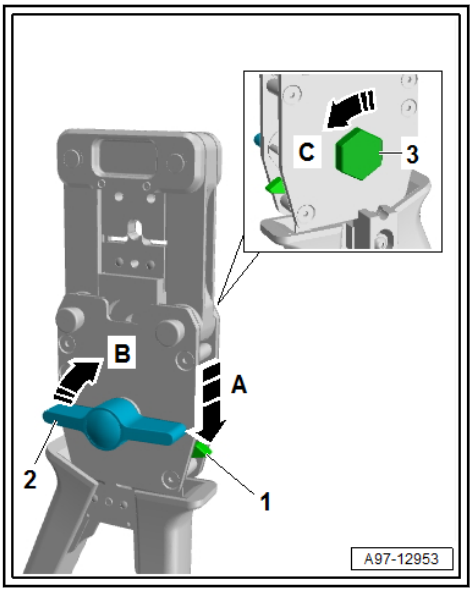
– Turn quick-action lever -2- in direction of -arrow B- until crimping anvil is in the start position.



If premature release is not possible by hand:

– Release release lever -1- in direction of -arrow A-.

– Turn quick-action lever -3- in direction of -arrow C- until crimping anvil is in the start position.



1.1.6 Repairing 2.5 mm, 4 mm or 6 mm aluminium wires with a single crimp connector

Special tools and workshop equipment required

- hot air blower - VAS 1978/14A-
- shrink adapter for hot air blower - VAS 1978/15A-
- wiring harness repair set - VAS 631 001-
- wiring harness repair set - VAS 631 003-

Note

Copper wires are used for repairs ⇒ Electronic parts catalogue (ETKA) .

Removing

– Attach crimping anvil, crimping die and contact positioner with contact locking device matching the wire cross-section to crimping pliers from wiring harness repair set - VAS 631 003- .

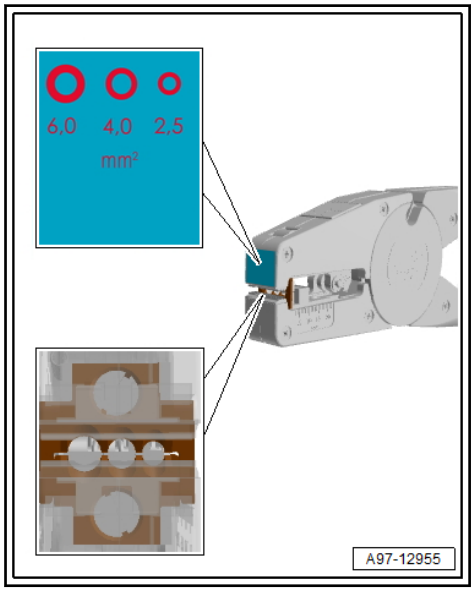
– Cut out damaged section of wire.

– Insert end of wire from front to stop into appropriate recess in wire stripper from wiring harness repair set - VAS 631 001- .
– Press together wire stripper, then open it again.
– Remove stripped wire.

Important

- Insulation must be cut cleanly and removed from wire.
- Single wires must not be damaged.

– Strip end of other electrical wire in the same way.



– Push heat-shrink hose ⇒ Electronic parts catalogue (ETKA) onto electrical wire.

– Insert crimp connector -1- into contact positioner -2-.

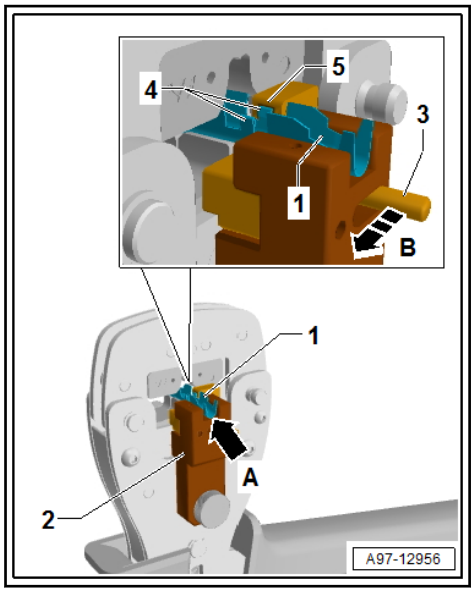
Important

- The crimp connector -1- must be flush -arrow A- with the contact positioner -2-.

– Push contact locking device -3- to stop in direction of -arrow B- until crimp connector -1- is fixed.

Important

- Lugs -4- on crimp connector -1- must engage in groove -5- on contact locking device -3-.

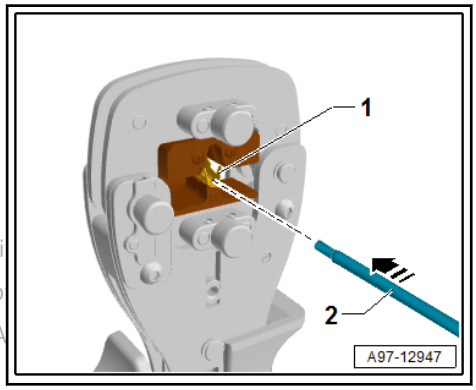


– Insert stripped end of wire -2- to stop in direction of -arrow- into crimp connector -1-.

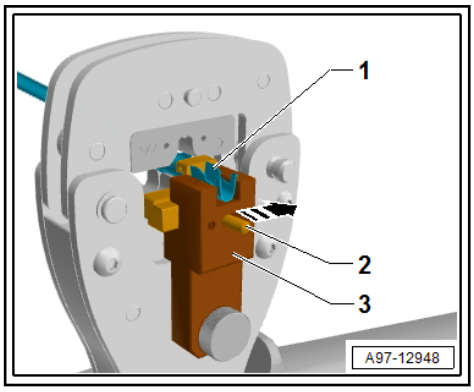
Important

- All single wires must be pushed into crimp connector -1-
- End of insulation of wire -2- should reach no further than to front edge of insulation crimp.

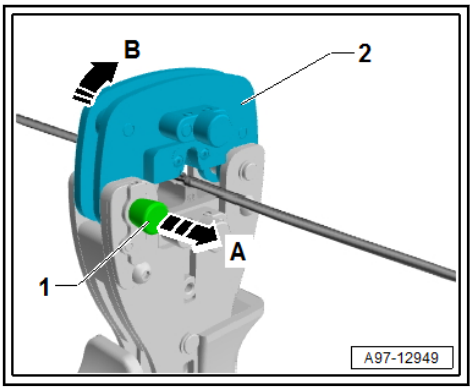
– Close crimping pliers until crimping pliers open again automatically.



– Push contact locking device -2- to stop in direction of -arrow-.
– Remove crimp connector -1- from contact positioner -3-.
– Turn crimping pliers over.
– Crimp wire -1- with crimp connector -2- on other side as described.



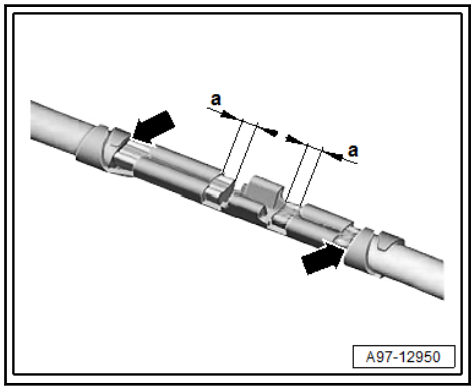
– Pull out locking pin -1- in direction of arrow -A- as far as it will go.
– Open adapter -2- in direction of arrow -B-.
– Remove crimped crimp connector.



– Check crimped crimp connector.

Important

- Dimension -A- = 0.1 mm ... 1.0 mm
- The end of insulation -arrow- should reach no further than to the front edge of the insulation crimp.



– Push heat-shrink hose -1- centrally over crimp connector -2-.

Important

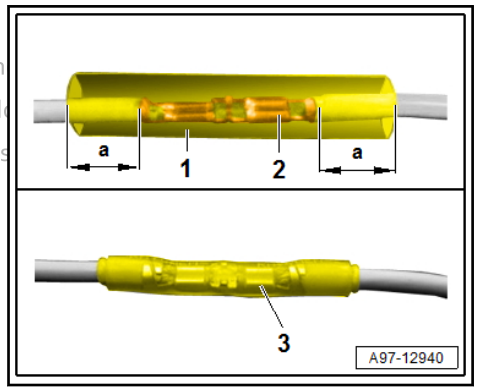
- Dimension -a- must be even on both sides.

– Shrink heat-shrink hose -1- from inside outwards using hot air blower - VAS 1978/14A- and shrink adapter for hot air blower - VAS 1978/15A- .

– Inspect completed repair section -3-.

Important

- Heat-shrink hose -1- must be entirely shrunk.
- Adhesive must emerge from ends.



1.1.7 Repairing Ethernet lines

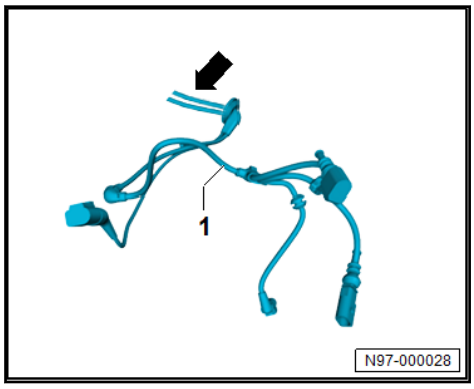
Damaged Ethernet cables must not be repaired and must be replaced.

1.1.8 Section repairs to electrical wiring

Removing

– Separate damaged wire at intended location -arrow- of old wire -1-.

– Connect new wire -1- at respective location -arrow-.



1.1.9 Fitting single wire seals

Special tools and workshop equipment required

♦ wiring harness repair set - VAS 1978B-

– Information on fitting single wire seals is contained in the ⇒ Operating manual of wiring harness repair set - VAS 1978B- .

1.1.10 Repairing safety-relevant wiring

Special tools and workshop equipment required

- wiring harness repair set - VAS 1978-

Note

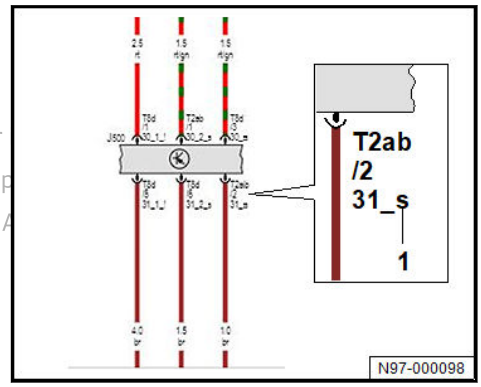
ISO 26262 is an ISO standard for safety-relevant electrical/electronic systems in motor vehicles. The implementation of the standard is intended to ensure the functional safety of a system with electrical/electronic components in motor vehicles.

Safety-relevant wiring suitable for repairs

Safety-relevant wires that may be repaired are labelled "_s" -1- at the end of the potential name in the circuit diagram. Due to increased safety requirements, have a second person monitor the repair.

– Identify safety-relevant wires in ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.

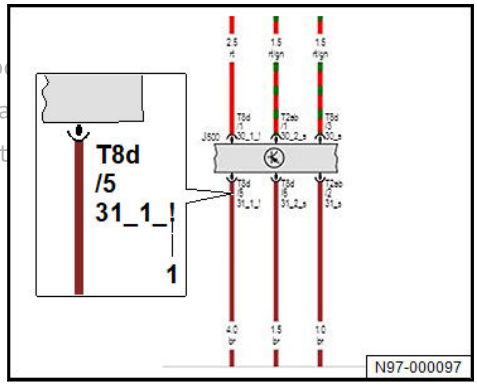
– Carry out repair using wiring harness repair set - VAS 1978- and have it checked by a second person.



Safety-relevant wiring not suitable for repairs

Safety-relevant wires that must not be repaired are labelled "_!" -1- at the end of the potential name in the circuit diagram. No repairs are permissible due to increased safety requirements.

– Identify safety-relevant wires in ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
– Renew wires completely, and route them according to their original installation position.



Important

- Route wires in such a way that they cannot become trapped or chafe.
- Secure wires to wiring harness at intervals of approx. 20 cm.

1.2 Repairing fibre optic cables

1.2.1 Repairing fibre optic cables

Special tools and workshop equipment required

- cutting pliers - VAS 6228-
- pliers for corrugated tube installation - VAS 6223/10-
- repair kit for fibre optic cables - VAS 6223B-

Replace a damaged fibre optic cable with a new cable from repair kit for fibre optic cables - VAS 6223B- . Prepare new cable using the repair kit, and route it parallel to the damaged fibre optic cable.

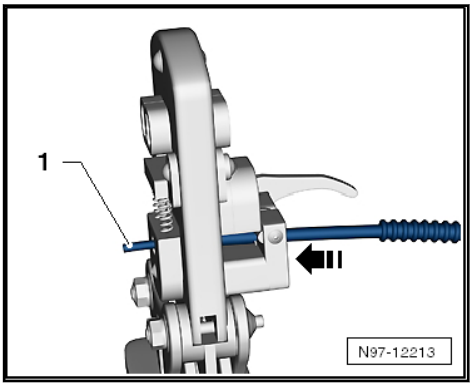
Note

⇒ Vehicle diagnostic tester can be used to determine between which components the fibre optic cable is damaged.

Cutting fibre optic cable to size

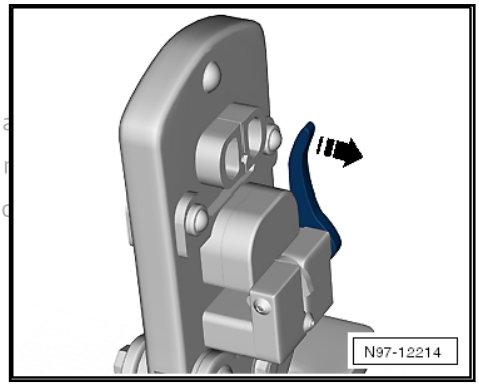
– Attach tool head to pliers for fibre-optic cables from repair kit.
– Determine required length of fibre optic cable.

– Open pliers. Insert length of fibre optic cable to be cut -1- in direction of -arrow- into cutting hole.
– Close pliers to cut the fibre optic cable to size.



Stripping fibre optic cable

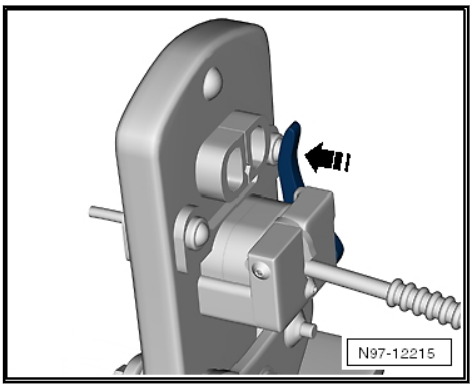
– Open pliers.
– Push stripping lever to stop in direction of -arrow-.
– Insert fibre optic cable into the stripping hole.



Important

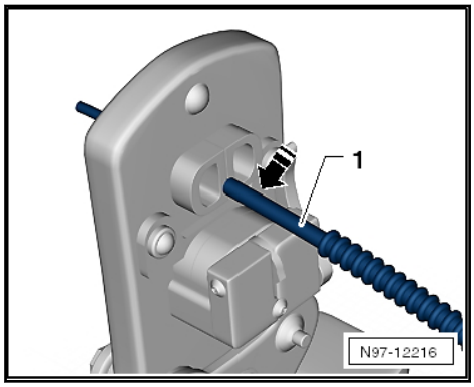
- Fibre optic cable must be flush with the rear of the cutting pliers.

– Close pliers, and hold them there.
– Push stripping lever to stop in direction of -arrow-.
– Remove fibre optic cable.



Cutting precisely

– Insert fibre optic cable -1- into the cutting hole.



Important

- Insulation must be lying against stop of cutting station.

– Remove pliers and fibre optic cable -1-.

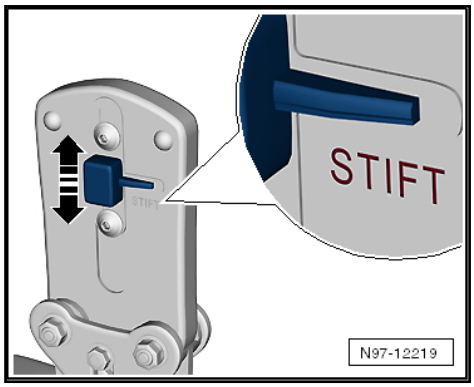
Important

- There must not be any burrs on the end face.

Fitting brass pin contact to fibre optic cable

– Change tool head on pliers.

– Push locking element on tool head in direction of -arrow-.

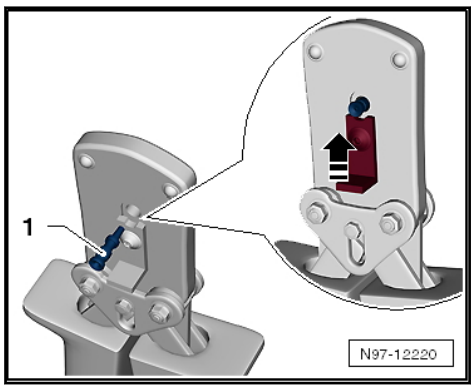


Important

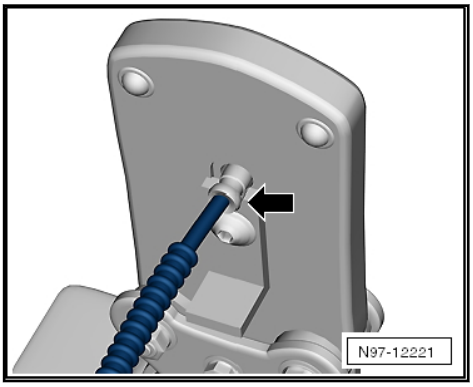
- Lettering “STIFT” must be visible.

– Insert brass pin contact -1- into mounting.

– Press locking lever on tool head in direction of -arrow- to locked position.



– Insert fibre optic cable to spring-loaded stop into brass pin contact -arrow-.
– Close pliers completely, then open them again.
– Remove fibre optic cable with brass pin contact -arrow-.



– Check that the brass pin contact -2- is correctly attached to fibre optic cable -1-.

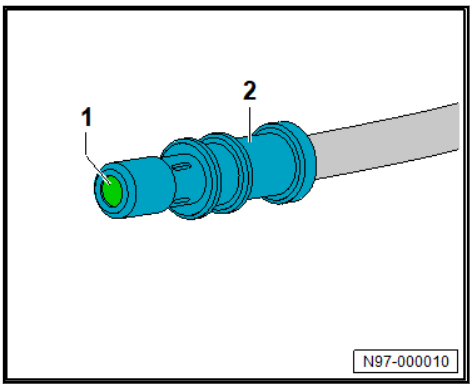
Important

- 4 crimping points must be visible on the brass pin contact -2-.
- Make sure that the brass pin contact -2- cannot be pulled off the fibre optic cable -1- by hand.

– Check fibre optic cable for damage -1-.

Important

- The end face of the fibre optic cable -1- must be located 0.01 … 0.1 mm behind the brass pin contact -2-.



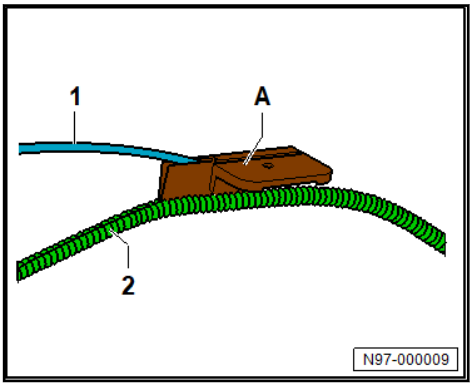
Fitting corrugated tube onto fibre optic cable

– Use cutting pliers - VAS 6228- to cut corrugated tube to required length.

Important

- Corrugated tube must be cut at wave crest.
- When the corrugated tube is installed, it must be heard to engage in the housing of the fibre optic cable.

– Insert fibre optic cable -1- into pliers for corrugated tube installation - VAS 6223/10- -A-.
– Apply pliers -A- at slot in corrugated tube -2-.
– Push pliers -A- along corrugated tube -2-.
– Insert fibre optic cable -1- into corrugated tube -2-.



1.2.2 Removing and installing fibre optic cable of wiring harness connector

Special tools and workshop equipment required

- protective cap for cable connectors - VAS 6223/9-

Removing

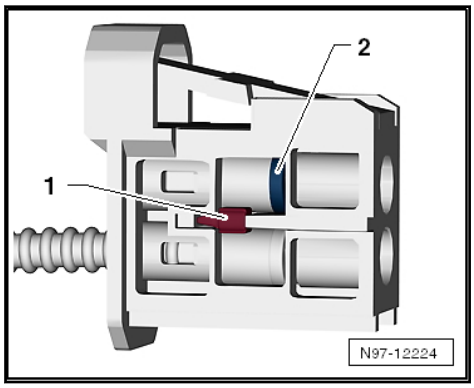
– Disconnect fibre optic cable connector from control unit.

– Mark lines to ensure proper allocation.

– Release fastener -1-.

– Release secondary fastener -2-.

– Remove fibre optic cable.



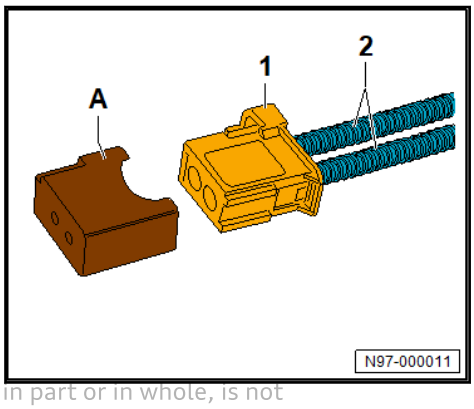
Installing

Install in reverse order of removal, observing the following:

– Install fibre optic cable in accordance with markings.

– Push corrugated tube -2- into connector -1-.

– Seal connector -1- using protective cap for cable connectors - VAS 6223/9- -A-.



1.3 Repair of aerial wires

1.3.1 Repairing aerial wires

Special tools and workshop equipment required

- crimping tool RG 174 - VAS 6720/4-

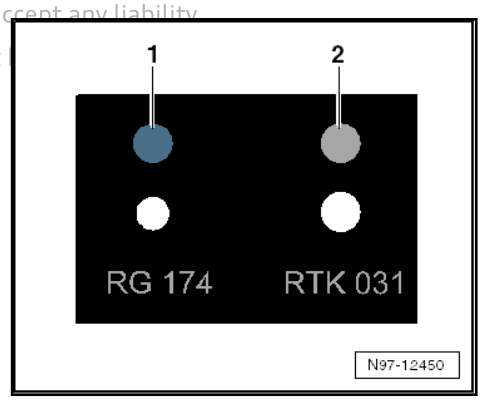
- crimping tool RTK-031 - VAS 6720/2-
- repair kit, aerial wire - VAS 6720-
- wire stripping tool RG 174 - VAS 6720/3-
- wire stripping tool RTK-031 - VAS 6720/1-

Determining correct aerial wire system for repairs

– Using gauge from repair set, aerial cable - VAS 6720- , check which aerial wire system needs to be repaired.

1 - System RG 174 = blue

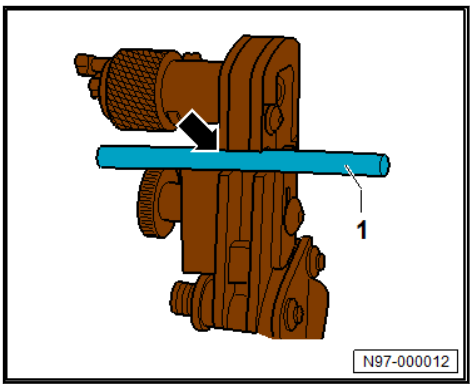
2 - System RTK 031 = grey



Cutting off the aerial wire

– Attach wire stripping tool RTK-031 - VAS 6720/1- or wire stripping tool RG 174 - VAS 6720/3- , as suitable, to crimping pliers from repair kit, aerial wire - VAS 6720- .

– Push aerial wire -1- into cutting mechanism -arrow-.
– Close crimping pliers, then open it again.
– Remove aerial wire -1-.



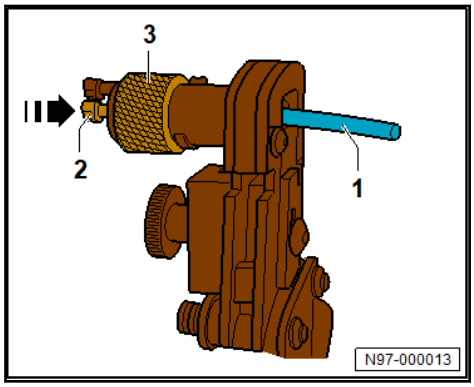
Stripping the shielding

– Push locating pin -2- in direction of -arrow- to stop into rotary cutter -3-.

– Push aerial wire -1- to stop into rotary cutter -3-.

Important

• Make sure that locating pin -2- is completely pushed out of rotary cutter -3-.



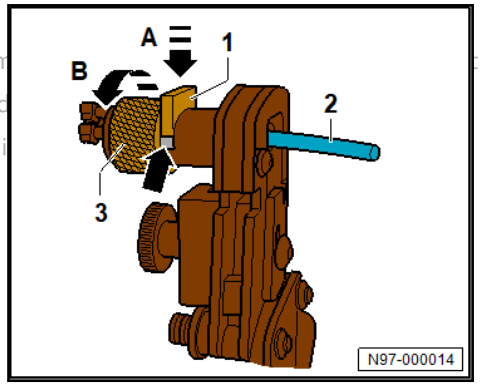
– Engage blade holder -1- in rotary cutter -3- in direction of -arrow A-.

Important

• Make sure that gap -arrow- is completely closed.

– Hold aerial wire -2- in position.

– Turn rotary cutter -3- in direction of -arrow B- until it is easy to turn.



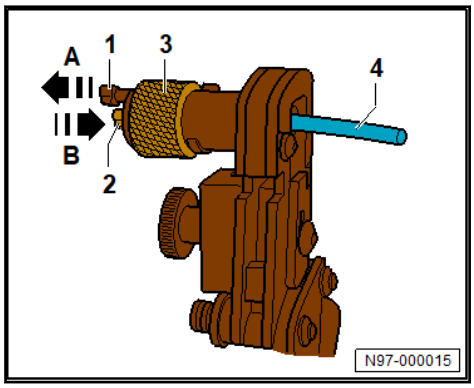
– Pull out release pin -1- in direction of -arrow A- until blade holder is released from aerial wire -4-.

– Push locating pin -2- in direction of -arrow B- to stop into rotary cutter -3-.

Important

• Aerial wire -4- is pushed out of rotary cutter -3-.

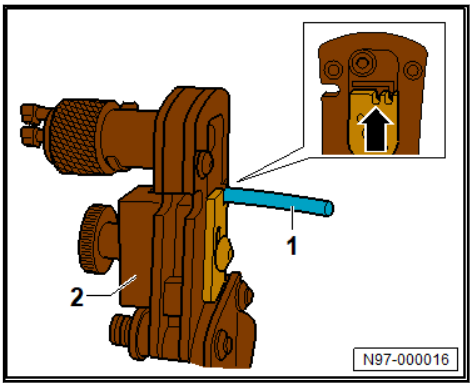
– Remove aerial wire -4-.



– Remove shielding from aerial wire.

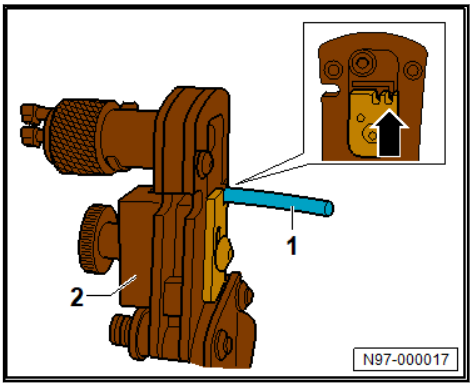
Stripping the outer sleeve

– Push aerial wire -1- as far as stop -2- into recess -arrow-.
– Close crimping pliers, then open it again.
– Pull out aerial wire -1-.



Stripping the inner insulation

– Push aerial wire -1- as far as stop -2- into recess -arrow-.
– Close crimping pliers, then open it again.
– Pull out aerial wire -1-.



Crimping the inner conductor

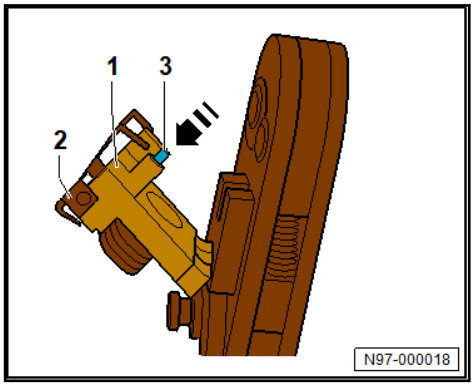
– Attach crimping tool RTK-031 - VAS 6720/2- or crimping tool RG 174 - VAS 6720/4- , as suitable, to crimping pliers from repair kit, aerial wire - VAS 6720- .

– Tilt back swinging positioner -1-.
– Open positioning piece -2-.
– Push inner contact -3- in direction of -arrow- to stop into swinging positioner -1-.
– Close positioning piece -2-.

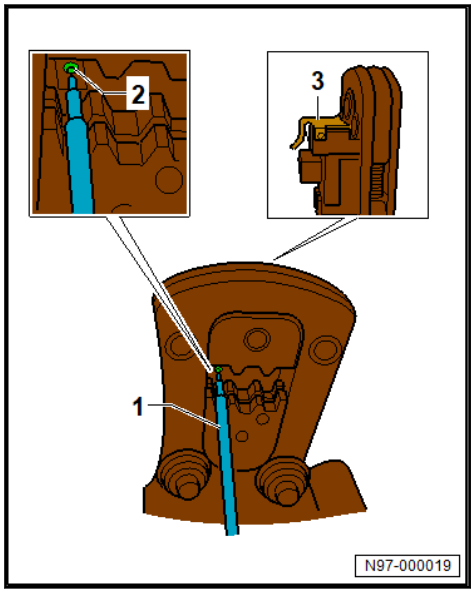
Important

• Inner contact -3- is fixed in place.

– Tip swinging positioner -1- inwards.

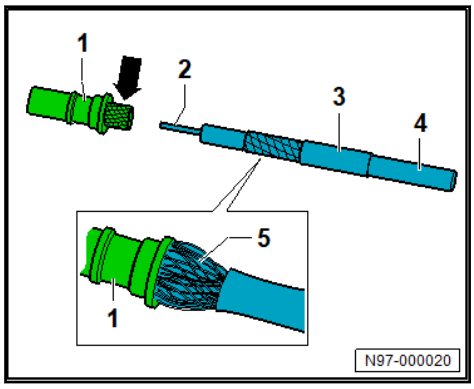


– Push aerial wire -1- into inner contact -2-.
– Close crimping pliers until crimping pliers open again automatically.
– Open positioning piece -3-.
– Remove aerial wire -1-.

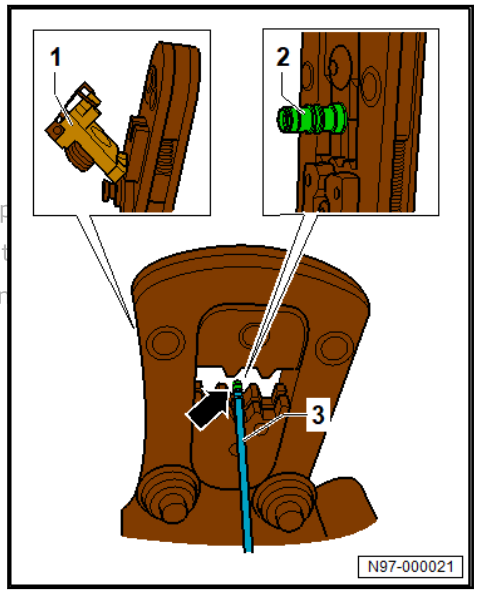


Crimping the outer conductor

– Push sleeve -3- over aerial wire -4-.
– Push knurled contact part -arrow- of outer contact -1- over aluminium foil.
– Push shielding -5- into outer contact -1-.
– Push outer contact -1- entirely over inner conductor -2-.
– Push sleeve -3- over shielding -5-.



– Tilt back swinging positioner -1-.
– Insert outer contact -2- into centre profile -arrow- of crimping tool RTK-031 - VAS 6720/2- or crimping tool RG 174 - VAS 6720/4- , respectively.
– Close crimping pliers until crimping pliers open again automatically.
– Remove aerial wire -3-.



2 Cleaning contact surfaces

2.1 Cleaning battery clamp and battery terminal

Special tools and workshop equipment required

- contact surface cleaning set - VAS 6410-

NOTICE

Risk of damage to threaded connections when working with too high torque settings.

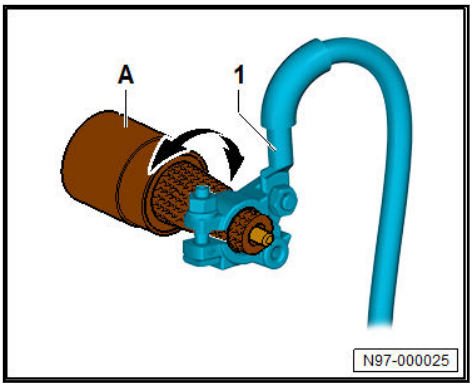
– The use of rust removers, contact sprays or greases is prohibited.

Removing

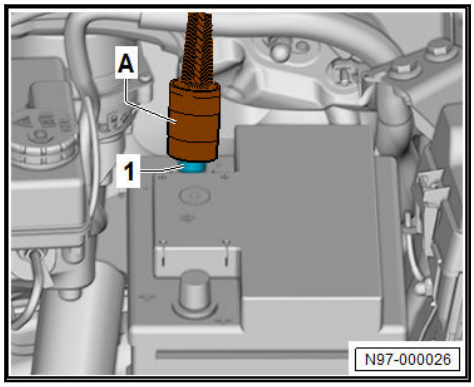
– Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

– Check battery terminal clamp and battery terminal for corrosion and dirt.

– Clean battery clamp -1- by rotating wire brush -A- from contact surface cleaning set - VAS 6410- back and forth -arrows-.



– Clean battery terminal -1- by rotating wire brush -A- from contact surface cleaning set back and forth.



Installing

Install in reverse order of removal, observing the following:

– ⇒ Electrical system; Rep. gr. 27 ; Battery; Assembly overview – battery .

2.2 Anti-corrosion treatment of contact surfaces

Important

- Use hose supplied with tin holding corrosion protection agent.
- Use anti-corrosion wax for cold areas.

⇒ Electronic parts catalogue (ETKA)

Important

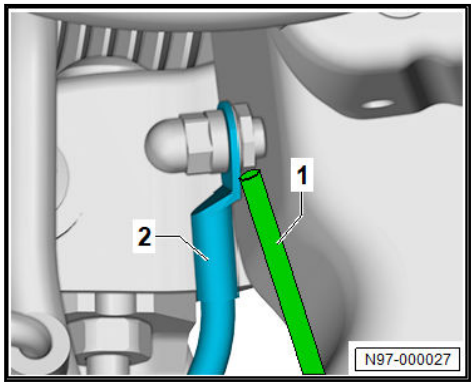
- Use cavity sealant for warm areas ⇒ Electronic parts catalogue (ETKA) .

Note

The agent will reach the affected area itself through capillary action.

Anti-corrosion treatment

– Hold hose -1- of tin with corrosion protection agent under terminal -2-, and spray threaded connection all around.



2.3 Cleaning terminals

Special tools and workshop equipment required

- contact surface cleaning set - VAS 6410-

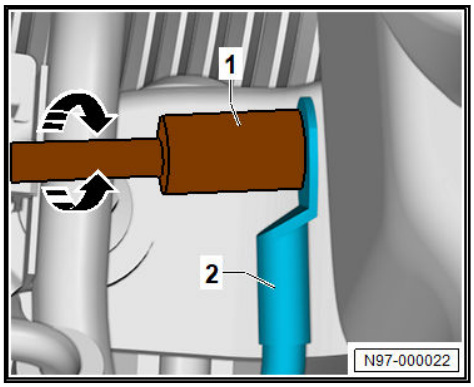
Note

Use the grey sanding pads for light soiling and soft surfaces.
Use the red sanding pads for heavy soiling and hard surfaces.

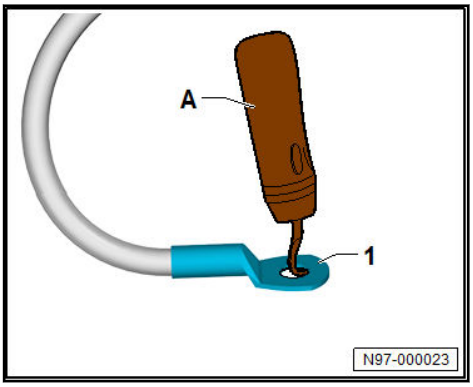
Removing

– Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

– Unscrew cap nut.
– Remove terminal -2-.
– Check terminal -2- for corrosion and soiling.
– Position adapter from contact surface cleaning set - VAS 6410- -1- in terminal -2-, and rotate it back and forth in direction of -arrows-.



– Remove punching burr from terminal -1- using deburrer -A- from contact surface cleaning set.



2.4 Cleaning threaded connections

Special tools and workshop equipment required

- contact surface cleaning set - VAS 6410-

Note

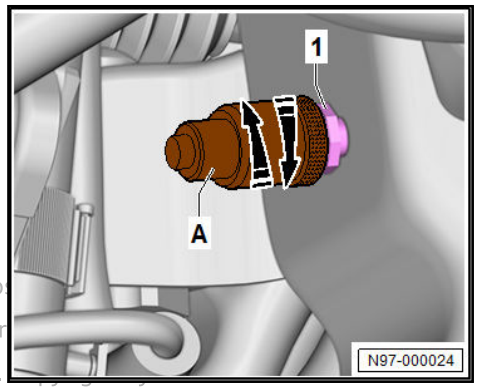
Use the grey sanding pads for light soiling and soft surfaces.
Use the red sanding pads for heavy soiling and hard surfaces.

Removing

– Disconnect battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Disconnecting and connecting battery .

– Unscrew terminal of respective threaded connection -1-.

– Fit adapter -A- from contact surface cleaning set - VAS 6410- onto threaded connection -1-, and rotate it back and forth -arrows-.



3 Connector housing

3.1 Dismantling connector housings

Removing

– The process of dismantling connector housings is described in the ⇒ Electronic parts catalogue (ETKA) .

- Select connector housing
- Select part information
- Select repair information

3.2 Repairing contacts in connector housings

Removing

– The process of repairing the contacts in connector housings is described in the ⇒ Electronic parts catalogue (ETKA) .

- Select special catalogue “Electrical connecting elements”
- Select model year
- Select electrical equipment; sub-group 71, from diagram 970-00
- Select connector housing
- Select part information
- Select repair information

4 ESD workplace

4.1 Repair notes on ESD workplace

The ESD workplace serves to protect electronic components from damage through electrostatic discharge.

Measures that require the use of the ESD workplace are indicated in the relevant chapter of the workshop manual.

Important

- Use only non-magnetic tools.

The ESD workplace is used for the following work:

- repairs to particularly sensitive electronic components.
- repairs to exposed printed circuits.