EN

K

Installation documentation

for Thermo Top Evo water heater

'Inline' coolant circuit with engine preheating

Mazda M6

Left-hand drive vehicle

Manufacturer	Model	Type	Model year	EG-BE-No. / ABE	VIN
Mazda	M6	GL	from 2018	e1* 2001/116* 0448*…	JMZGL******600001 -

Motorisation	Fuel	Emission standard	Transmission type	Output [kW]	Displacement [cm³]	Engine code
2.2D	Diesel	Euro 6d Temp	6-speed SG	110	2191	SH
2.2D	Diesel	Euro 6d Temp	6-speed AG	110	2191	SH
2.2D	Diesel	Euro 6d Temp	6-speed SG	135	2191	SH
2.2D	Diesel	Euro 6d Temp	6-speed AG	135	2191	SH

Validity	Equipment variants	Model
		M6
Verified equipment variants	2 zone automatic air-conditioning	x
	Passenger compartment monitoring	x
	Regenerative braking system (i-ELOOP)	x
	Start-Stop (i-Stop)	x
	Electrical Coolant Control Valve	x
	2 WD	x
	4 WD	x

Total installation time	Note
8.0 hours	

Contents

1 List of abbreviations

AG	Automatic transmission
DP	Fuel pump
EPT	Telestart receiver
HG	Heater
PWM	Pulse width modulator
RSH	Relay and fuse holder of passenger compartment
SG	Manual transmission
SH2	Engine compartment fuse holder for F1/F2
UP	Coolant pump

2 Installation notes

2.1 Information on Validity

This installation documentation applies to vehicles listed on page 1, assuming technical modifications to the vehicle do not affect installation, any liability claims excluded. Depending on the vehicle version and equipment, modifications may be necessary during installation with respect to this installation documentation. Vehicle and engine types, equipment variants and other specifications not listed in this installation documentation have not been tested. However, installation according to this installation documentation may be possible.

2.2 Components used

Designation	Order number
Basic delivery scope of Thermo Top Evo 5 diesel	4100-78-774A
Installation kit for Mazda M6 2018 diesel	4100-78-833A
Original Mazda coolant hose	GRG1-61-24X
Original Mazda coolant hose	GRG1-61-24Y
In case of Telestart, control element, as well as indicator lamp in consultation with end customer	MAZDA ACCESSORY BASE

2.3 Information on Total Installation Time

The total installation time includes the time needed for mounting and demounting the vehicle-specific components, the heater specific installation time and all other times required for the system integration and initial start-up of the heater.
The total installation time may vary for vehicle equipment other than provided.

2.4 Installation recommendations

Arrange for the vehicle to be delivered with the tank only about ¼ full.
The installation location for the Telestart or ThermoCall push button should be confirmed with the end customer.
Depending on the space required and the vehicle manufacturer's instructions, we recommend the use of a vehicle battery with a higher electrical capacity.

3 About this document

3.1 Purpose of the document

This installation documentation is part of the product and contains all the information required to ensure professional vehicle specific installation of the:

Thermo Top Evo heater

3.2 Warranty and liability

Webasto shall assume no liability for defects, damage and injuries resulting from a failure to observe the installation, repair and operating instructions of the information contained in them.

This liability exclusion particularly applies to improper installations and repairs by untrained persons or in the case of a failure to use genuine spare parts.

The liability due to culpable disregard to life, limb or health and due to damage or injuries caused by a wilful or reckless breach of duty remain unaffected, as does the obligatory product liability.

Installation should be carried out according to the general, standard rules of technology. Unless specified otherwise, fasten hoses, lines and wiring harnesses to original vehicle lines and wiring harnesses using cable ties. Insulate loose wire ends and tie back. Connectors on electronic components must audibly snap into place during assembly.

Spray unfinished body areas, e.g. drilled holes, with anti-corrosion wax (Tectyl 100K).

Observe the instructions and guidelines of the respective vehicle manufacturer for demounting and mounting vehicle specific components.

The initial start-up is to be executed with the Webasto Thermo Test Diagnosis.

When installing a programmable control module (e.g. a PWM Gateway), the corresponding settings must be checked or adjusted.

3.2.1 Statutory regulations governing installation

The Thermo Top Evo heater has been type-tested and approved in accordance with ECE-R 10 (EMC) and ECE-R 122 (heater). The regulations of these guidelines are binding in the scope of the Directive 70/156/EEC and/or 2007/46/EC (for new vehicle models from 29/04/2009) and should also be observed in countries in which there are no special regulations.

The heater is licensed in accordance with paragraph 19, section 3, No. 2b of the StVZO (German Road Traffic Licensing Authority).

3.3 Safety

Qualifications of installation personnel

The installation personnel must have the following qualifications:

- Successful completion of Webasto training
- Corresponding qualification for working on technical systems

Regulations and legal requirements

The regulations from the heater's general installation and operating instructions must be observed.

3.3.1 Safety information on installation

Danger posed by live parts

- ▶ Prior to installation, disconnect the vehicle from the voltage supply.
- ▶ Make sure the electrical system is earthed correctly.
- ▶ Always comply with legal requirements.
- ▶ Observe data on type label.

Danger of fire and leaking toxic gases due to improper installation

- ▶ Vehicle parts in the vicinity of the heater must be protected against excessive heating by the following measures:
  - ⇨ Maintain minimum safety distances.
  - ⇨ Ensure adequate ventilation.
  - ⇨ Use fire-resistant materials or heat shields.

Danger due to sharp edges

- Lacerations
- Short circuit due to electrical wire damage

- ▶ Fit protectors on sharp edges.

3.4 Using this document

Before installing and operating the heater, read this installation documentation, the installation instructions of the heater, the operating instructions and supplementary sheets provided.

3.4.1 Explanatory Notes on the Document

There is an identification mark near the respective work step to allow you to quickly allocate the other applicable documents to the Webasto components to be installed:

Generally valid Webasto documentation	
Vehicle-specific installation documentation	K
Vehicle-specific installation documentation of the cold start kit	M
Webasto Comfort A/C control	H
Webasto Standard A/C control	G
Tank extracting device (e.g. FuelFix)	F
Exhaust end fastener (EFIX)	E
Combustion air intake silencer	L
Spacer bracket (ASH)	S

3.4.2 Use of symbols

DANGER

Type and source of the risk

Consequences: Failure to follow the instructions can result in death

▶ Actions to protect yourself against risks.

WARNING

Type and source of the risk

Consequences: Failure to follow the instructions can lead to serious or even fatal injuries

▶ Actions to protect yourself against risks.

CAUTION

Type and source of the risk

Consequences: Failure to follow the instructions can lead to minor injuries

▶ Actions to protect yourself against risks.

Type and source of the risk

Consequences: Failure to follow the instructions can lead to material damage

▶ Actions to protect yourself against risks.

Reference to the vehicle manufacturer's specific documents.

Note on a special technical feature

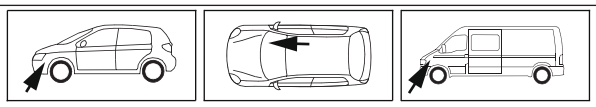
3.4.3 Work step identification marks

The ongoing work step is indicated on the outside top corner of the page:

Mechanical system	Electrical system	High-voltage	Coolant

Combustion air	Fuel	Exhaust	Software

3.4.4 Orientation aid



The arrow indicates the position on the vehicle and the viewing angle

3.4.5 Use of highlighting

Highlight	Explanation
✓	Action
▶	Necessary action
⇨	Result of an action
1 / 12 / a1	Position numbers for the image descriptions
① / ⑫ / Ⓐ	Position numbers for the image descriptions for electrical wires and wiring harnesses and coolant hose sections

4 Technical Information

Dimension specifications
– All dimensions specified in mm
– Perforated brackets and mounting angles are shown to scale
– Observe data regarding scale on the templates

Tightening torque specifications
– Tightening torque values of 5x13 heater bolts and 5x11 heater stud bolts = 8Nm
– Tightening torque values of 5x15 retaining plate of water connection piece bolts = 7Nm
– 5x12 bolt tightening torque of 2-part heater bracket = 6Nm
– Tighten other bolt connections in accordance with manufacturer's instructions or in accordance with state-of-the-art-technology

Temperature specification for heat shrink plastic tubings
– Fabric heat shrink tubing: shrink temperature max. 230°C
– Standard heat shrink plastic tubing: shrink temperature max. 300°C

Necessary special tools
– Hose clamp pliers for auto-tightening hose clamps
– Hose clamp pliers for Clic hose clamps of type W
– Hose clamping pliers
– Hose cutter
– Automatic wire stripper 0.2 - 6 mm²
– Crimping pliers for cable lugs 0.5 – 10 mm²
– Crimping pliers for male connector 0.14 – 6 mm²
– Crimping pliers for connector 0.25 – 6 mm²
– Torque wrench for 2.0 - 10 Nm
– Deep-hole marker
– Webasto Thermo Test Diagnosis with current software

5 Preparing measures

5.1 Heater preparation

Placing duplicate label

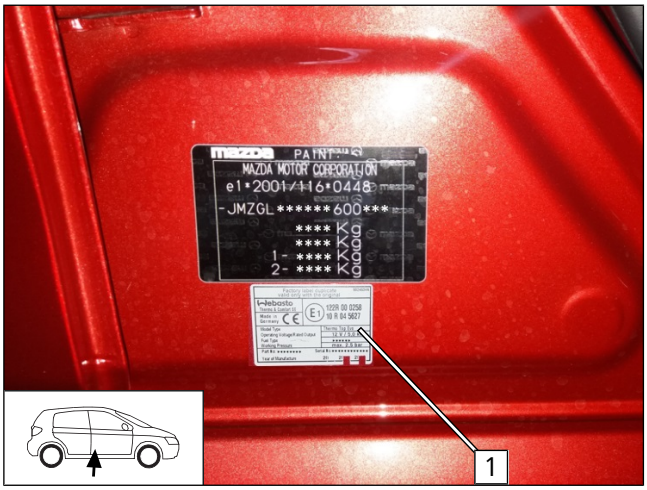
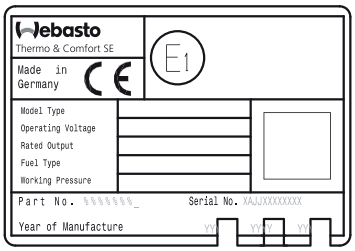


Fig. 1

Observe the general installation instructions of the heater.

- ▶ Remove years that do not apply from the type and duplicate label.
- ▶ Attach the duplicate label (type label) [1] in a clearly visible position on the B-pillar of the front passenger's side.



5.2 Applying sticker

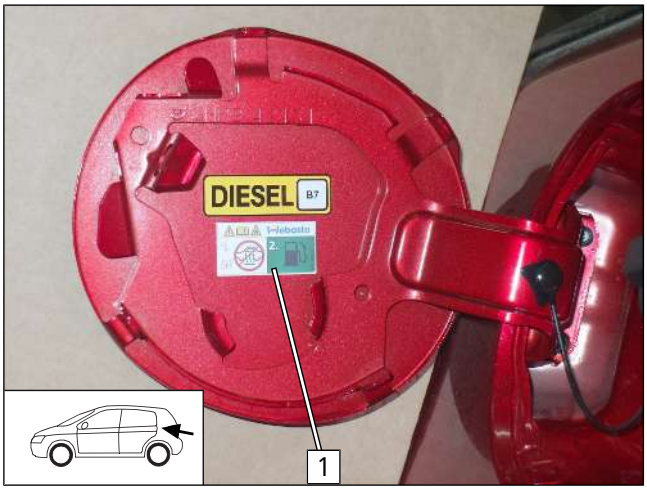


Fig. 2

- ▶ Apply the 'Switch off parking heater before refuelling' sticker [1] to the area of the filler point.

5.3 Before installing the heater

DANGER

The incorrect execution of electrical connections can cause a fire.

▶ The Mazda M6 uses a special battery for the i-Stop system (STOP+START). Check the battery before installing the heater. Check battery status according to the workshop manual (acid level check for each battery cell). If the battery acid level lies below the specification, replace the battery with an original battery.
Observe the following table:

Battery acid level	Result	Comments
> 1.25 g/cm³	OK	
1.17 - 1.24 g/cm³	Charge battery	If the battery acid level is < 1.25 g/cm³ after charging, replace the battery with an original battery.
< 1.17 g/cm³	Replace battery	Replace the battery with an original battery.

5.4 Vehicle preparation

Further information can be found in the vehicle manufacturer's technical documentation.

- ▶ Open the fuel tank cap
- ▶ Ventilate the fuel tank
- ▶ Close the fuel tank cap again
- ▶ Depressurise the cooling system. See MESI ‘ENGINE COOLANT LEVEL INSPECTION’
- ▶ Disconnect the battery and remove it completely with the carrier. See MESI ‘BATTERY REMOVAL/ INSTALLATION’
- ▶ Remove the upper engine cover . See MESI ‘ENGINE COVER REMOVAL/ INSTALLATION’
- ▶ Completely remove the air filter and housing. See MESI ‘INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION’
- ▶ Remove the lower engine cover. See MESI ‘FRONT UNDER COVER No.2 REMOVAL/ INSTALLATION’
- ▶ Remove the underbody trim No. 1 and 2. See MESI ‘FLOOR UNDER COVER REMOVAL/ INSTALLATION’
- ▶ Remove the middle underride protection (heat shield plate). See MESI ‘EXHAUST SYSTEM REMOVAL/ INSTALLATION’
- ▶ Remove the front entrance strip on the driver's side. See MESI ‘FRONT SCUFF PLATE REMOVAL/ INSTALLATION’
- ▶ Remove the front left footwell trim. See MESI ‘FRONT SIDE TRIM REMOVAL/ INSTALLATION’
- ▶ Detach the instrument panel trim under the steering wheel. See MESI ‘LOWER PANEL REMOVAL/ INSTALLATION’
- ▶ Remove the trim under the glove box. See MESI ‘DASHBOARD UNDER COVER REMOVAL/ INSTALLATION’
- ▶ Remove the glove box. See MESI ‘GLOVE COMPARTMENT REMOVAL/ INSTALLATION’
- ▶ Remove dashboard cover No. 2. See MESI ‘METER HOOD REMOVAL/ INSTALLATION’
- ▶ Detach and fold back the left rear bench seat. See MESI ‘REAR SEAT REMOVAL/ INSTALLATION’
- ▶ Open the left tank fitting service lid. See MESI ‘FUEL TANK REMOVAL/ INSTALLATION’

6 Installation overview

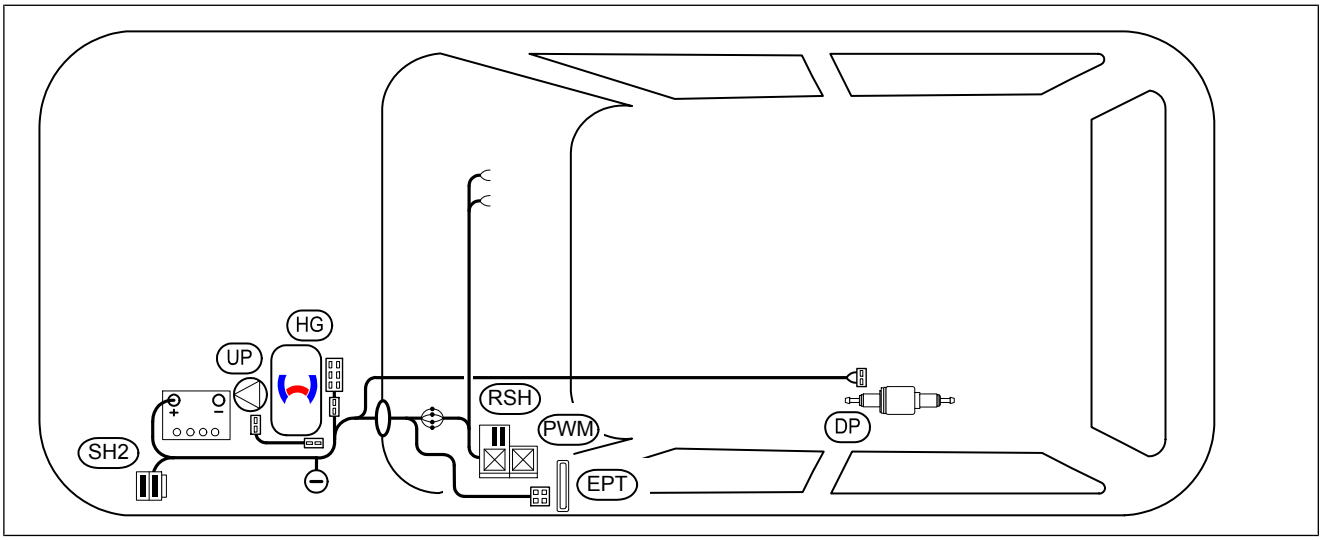


Fig. 3

Legend to installation overview

Abbreviation	Component
DP	Fuel pump
EPT	Telestart receiver
HG	Heater
PWM	PWM Gateway
RSH	Relay and fuse holder of passenger compartment
SH2	Engine compartment fuse holder for F1/F2
UP	Coolant pump

Heater installation location

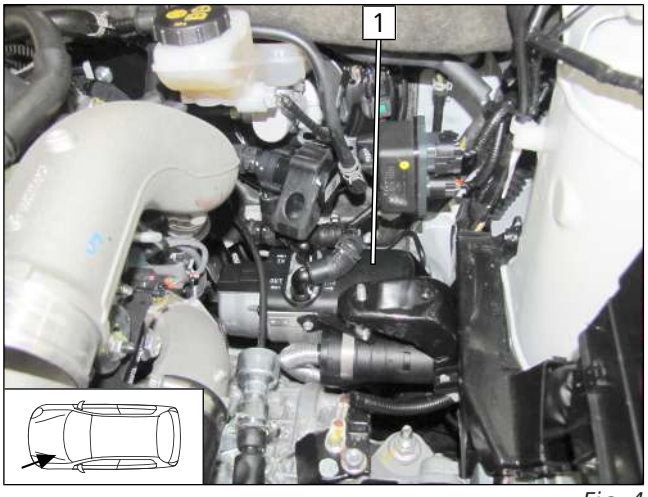


Fig. 4

1 Heater

7 Electrical system, general

7.1 Premounting wiring harness

Cutting fuel line to length

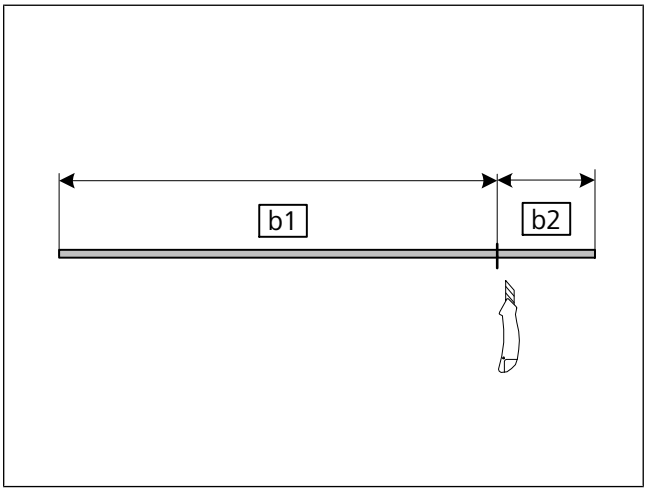


Fig. 5

	Length	Used for
b1	5500	Connection between heater and fuel pump
b2	500	Connection between fuel pump and tank extracting device

Cutting corrugated tubes to length, slitting corrugated tube h5

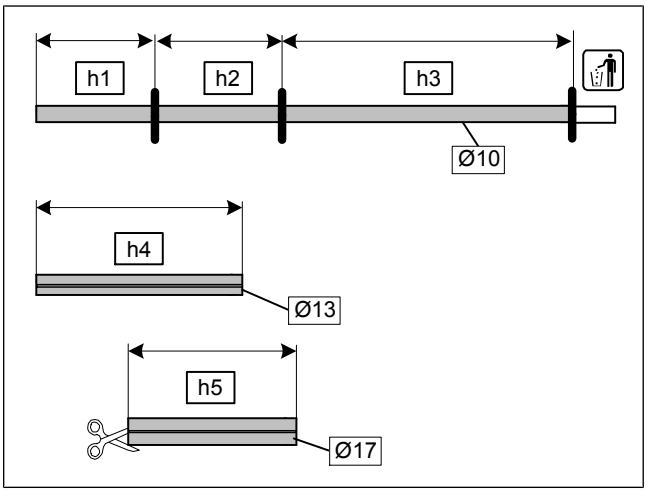


Fig. 6

	Length	Used for
h1	400	Red (rt) wire of battery +
h2	450	Fuel line b2 from tank extracting device to fuel pump
h3	1050	Fuel line b1 from heater, fuel pump wiring harness
h4	500	Heater wiring harness to engine compartment fuse holder
h5	350	Fuel line b1, heater wiring harness and coolant pump

General view of wiring harness and wiring allocation

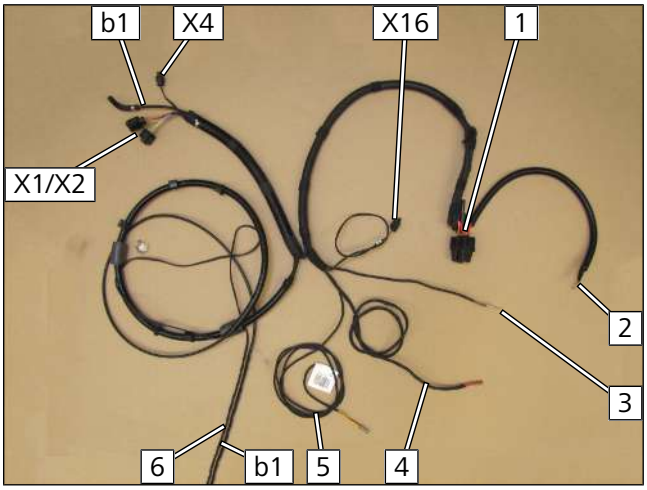


Fig. 7

- 1 Fuse holder of engine compartment
- 2 Red (rt) wire from B+
- 3 Earth wire
- 4 Passenger compartment heater wiring harness
- 5 Control element wiring harness
- 6 Fuel pump wiring harness
- b1 Fuel line
- X1 6-pin connector of heater wiring harness
- X2 2-pin connector of heater wiring harness
- X4 2-pin connector of coolant pump wiring harness
- X16 2-pin connector of coolant pump wiring harness

General view of corrugated tube installation

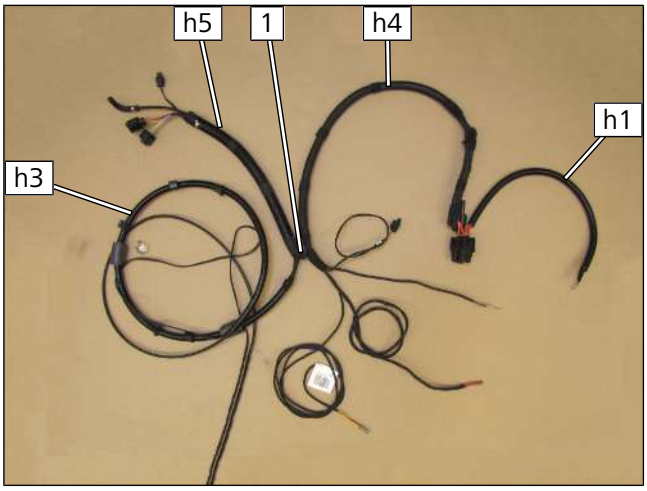


Fig. 8

▶ Node point **1** is the main starting point for wiring harness preparation. Wrap the corrugated tubes at the ends and at the node point with insulating tape.

Preparing wiring harness and fuel line

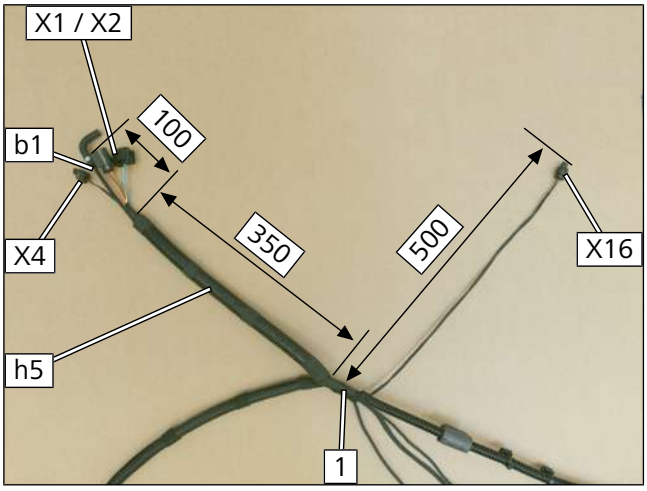


Fig. 9

▶ Draw fuel line **b1** (5500), fuel pump, coolant pump and heater wiring harnesses as well as excess length of the coolant pump wiring harness bundled into Ø17 corrugated tube **h5** (350, slitted).

1 Node point
X1 6-pin connector of heater wiring harness
X2 2-pin connector of heater wiring harness
X4 Coolant pump wiring harness connector
X16 Coolant pump wiring harness connector

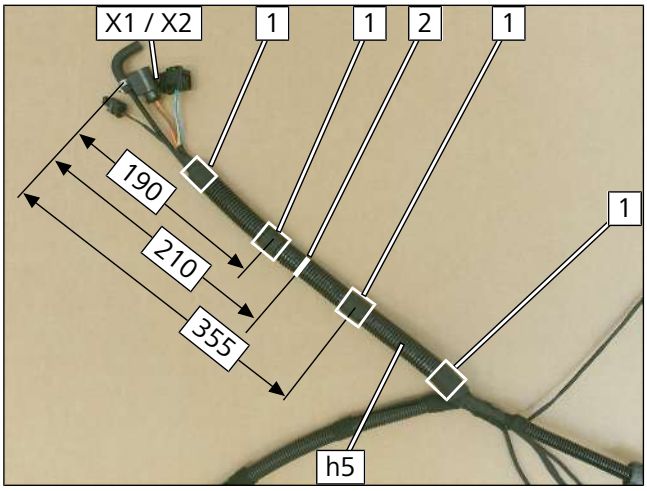


Fig. 10

▶ Apply a marking at position **2**.

▶ Wrap insulating tape around Ø17 corrugated tube **h5** (slit) at position **1** as shown.

X1 6-pin connector of heater wiring harness
X2 2-pin connector of heater wiring harness

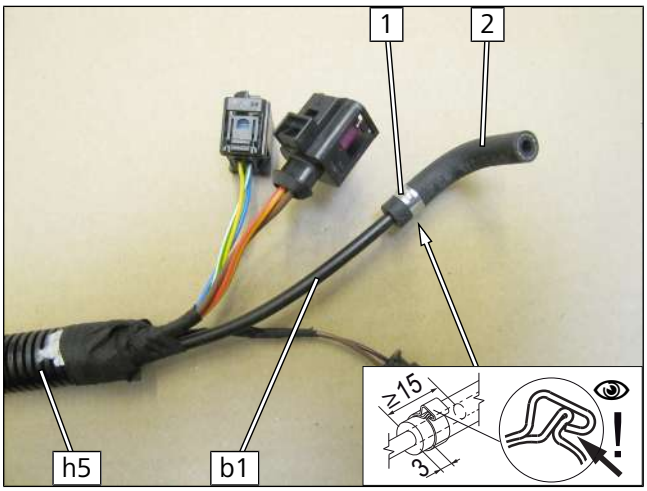


Fig. 11

▶ Mount moulded hose **2**.

1 Ø10 clamp
2 90° moulded hose
b1 Fuel line

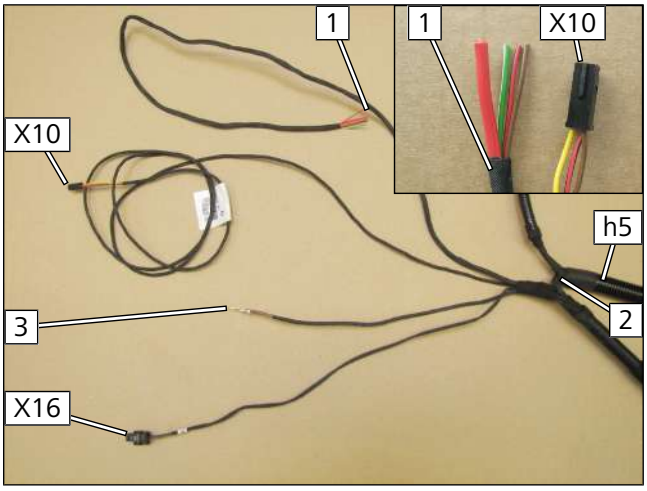


Fig. 12

1 Heater wiring harness to the passenger compartment
2 Node point
3 Earth wire
X10 Control element connector
X16 Coolant pump wiring harness connector

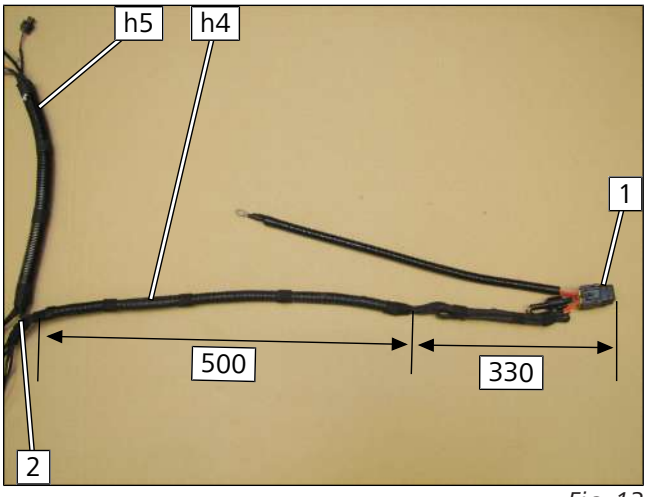


Fig. 13

▶ Draw engine compartment fuse holder wiring harness (see following figure), earth wire, passenger compartment and control element wiring harness into Ø13 corrugated tube **h4** (500).

1 Fuse holder of engine compartment
2 Node point

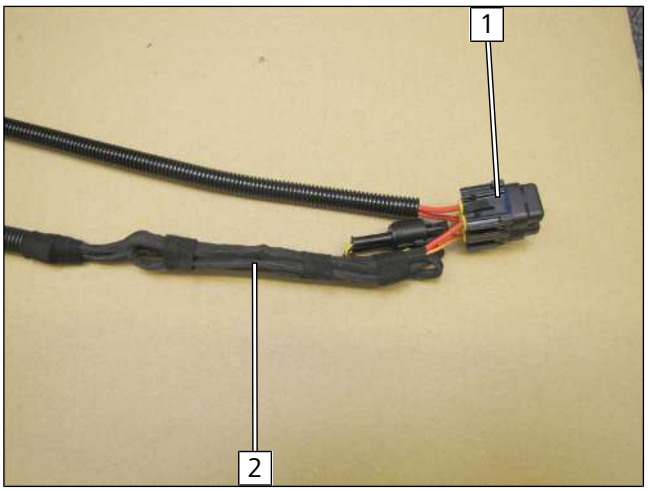


Fig. 14

▶ Tightly attach only the excess wiring harness length for the engine compartment fuse holder **2** as shown using insulating tape.

1 Fuse holder of engine compartment

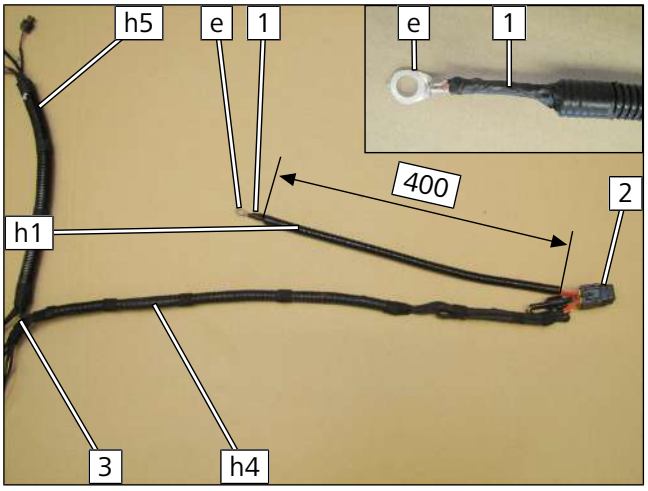


Fig. 15

▶ Draw red (rt) wire B+ into Ø10 corrugated tube **h1** (400). Fit cable lug **e** to red (rt) wire B+ **1** as shown in next figure, then insulate from cable lug crimping area to corrugated tube.

2 Fuse holder of engine compartment

3 Node point

Cable lug fitting instructions

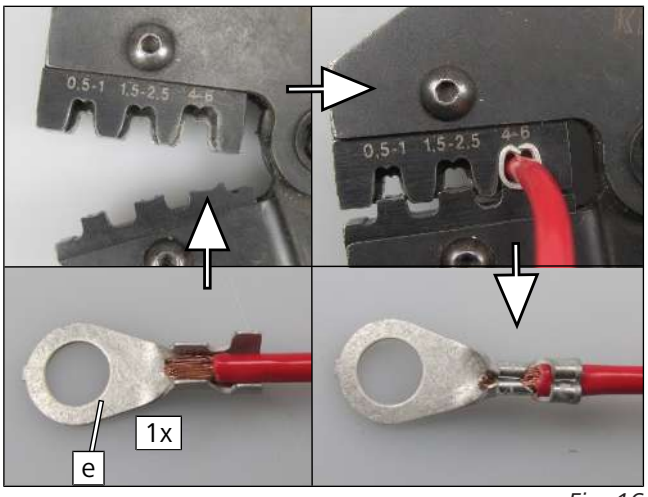


Fig. 16

Observe the next figures

e Ø8 cable lug for
4.0 - 6.0mm² wire cross-section

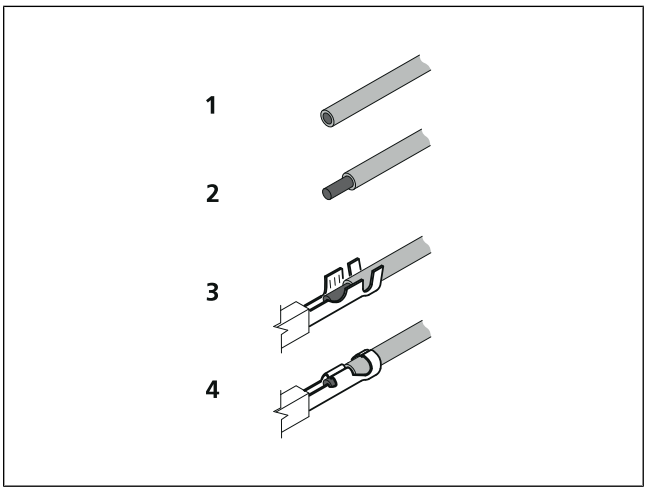


Fig. 17

Dismantling fuel pump connector X7

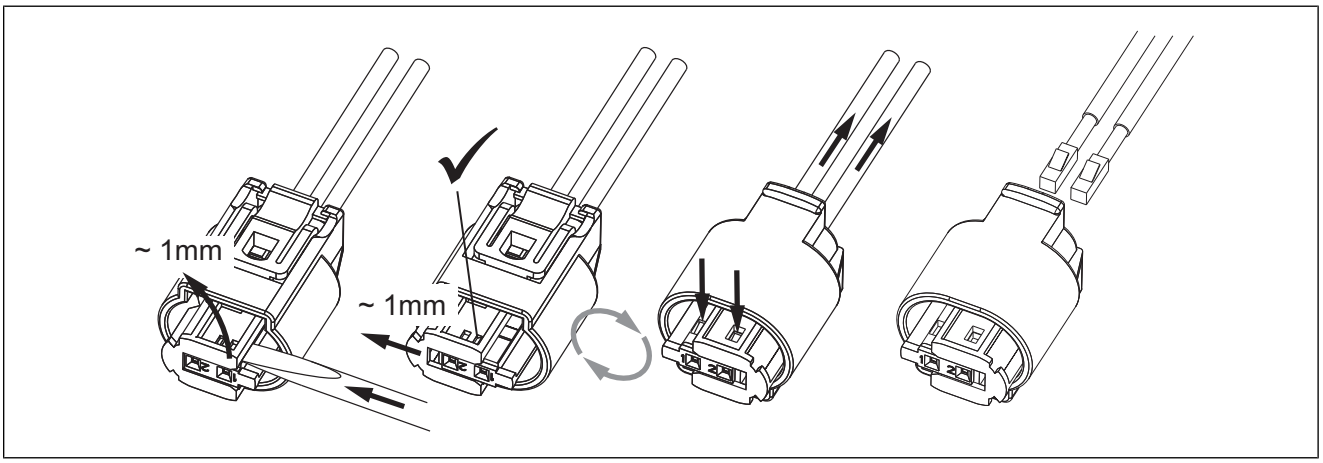


Fig. 18

Preparing wiring harness and fuel line

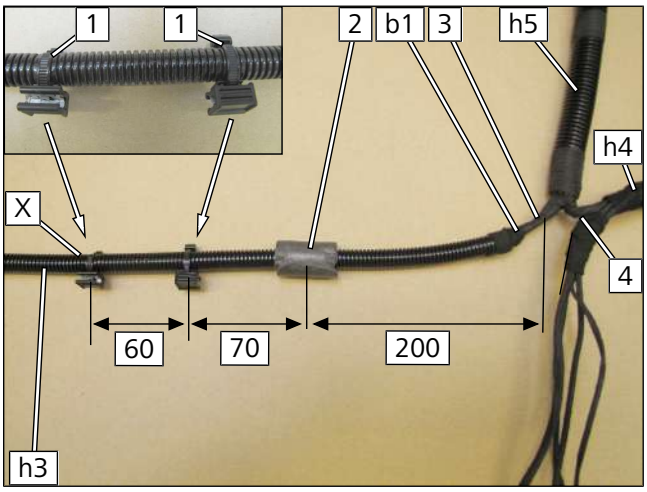


Fig. 19

▶ Draw fuel line **b1** and fuel pump wiring harness **3** into Ø10 corrugated tube **h3** (1050).

1 Edge clip cable tie (observe the clamping direction)

2 Self-adhesive foam strip

4 Node point

X Original position for the figure below

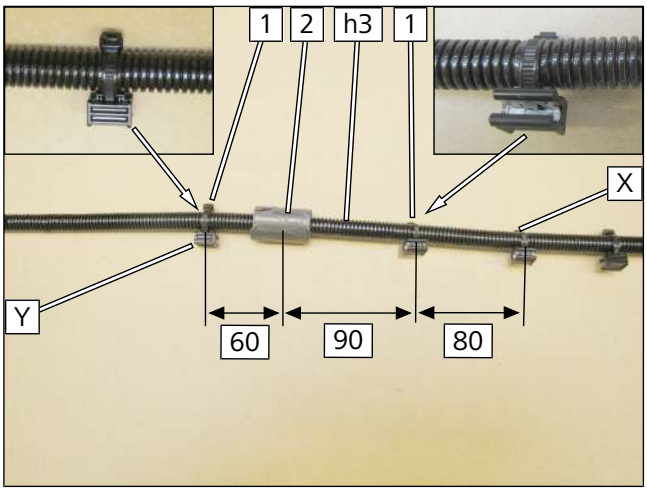


Fig. 20

1 Edge clip cable tie (observe the clamping direction)

2 Self-adhesive foam strip

X Original position from the previous figure

Y Original position for the figure below

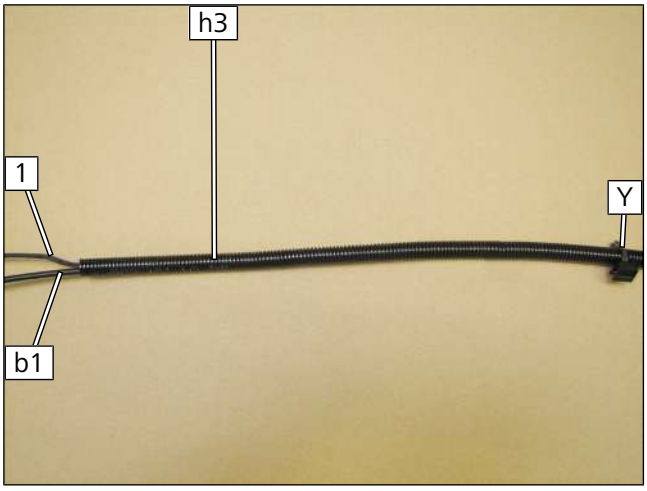


Fig. 21

1 Fuel pump wiring harness

Y Original position from the previous figure

Bending angle bracket

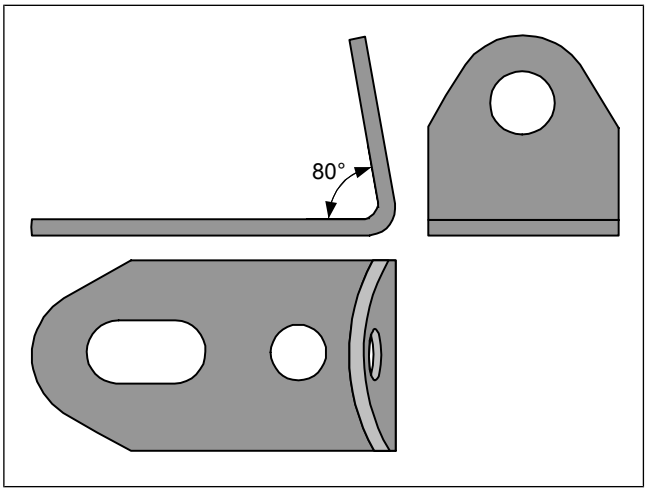


Fig. 22

Preparing retaining plate of fuse holder for F1/F2

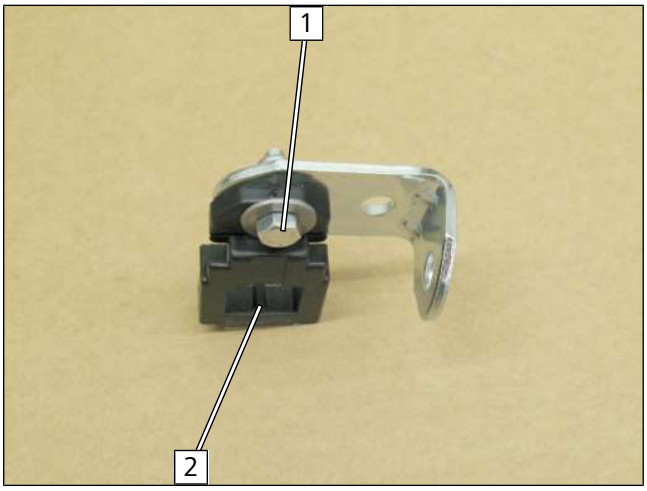


Fig. 23

1 M5x16 bolt, large diameter washer, fuse holder retaining plate 2, angle bracket, large diameter washer, nut (5-6Nm)

7.2 Electrical system of engine compartment

Loosening engine compartment fuse box

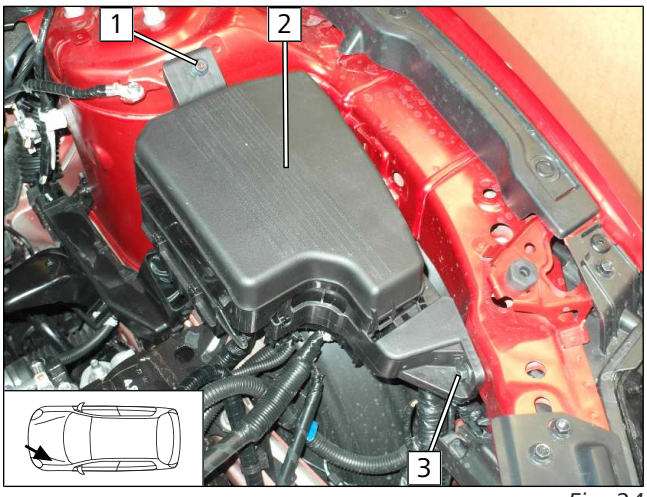


Fig. 24

1 Loosen original vehicle nut, it will be reused
2 Engine compartment fuse box
3 Loosen original vehicle bolt, it will be reused

Routing wiring harness in engine compartment

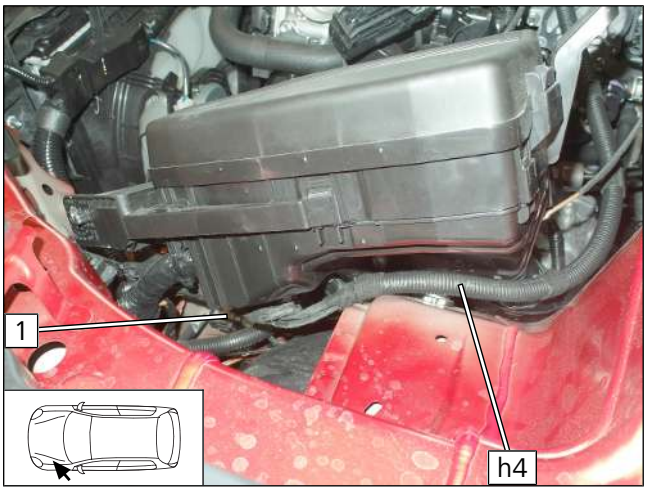


Fig. 25

▶ Route corrugated tube h4 with heater wiring harness, passenger compartment wires and control element wiring harness as shown.

1 Fuse holder of engine compartment (covered)

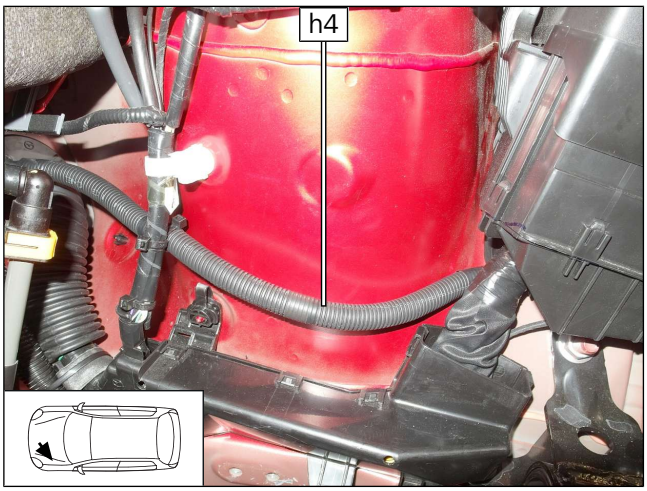


Fig. 26

▶ Route corrugated tube **h4** with heater wiring harness, passenger compartment wires and control element wiring harness to firewall.

Mounting retaining plate of fuses

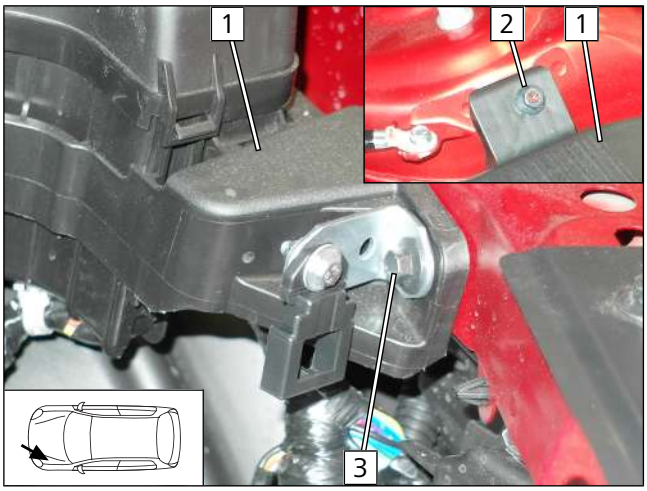


Fig. 27

▶ Mount engine compartment fuse box **1**.

2 Original vehicle nut (8-10Nm)

3 Original vehicle bolt, premounted angle bracket with retaining plate of fuses (8-10Nm)

Fastening corrugated tube **h5**

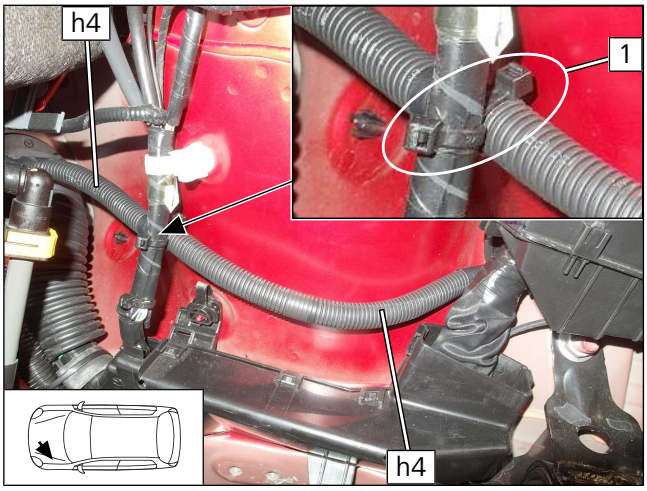


Fig. 28

1 Cable tie

Routing corrugated tube h4 and h6

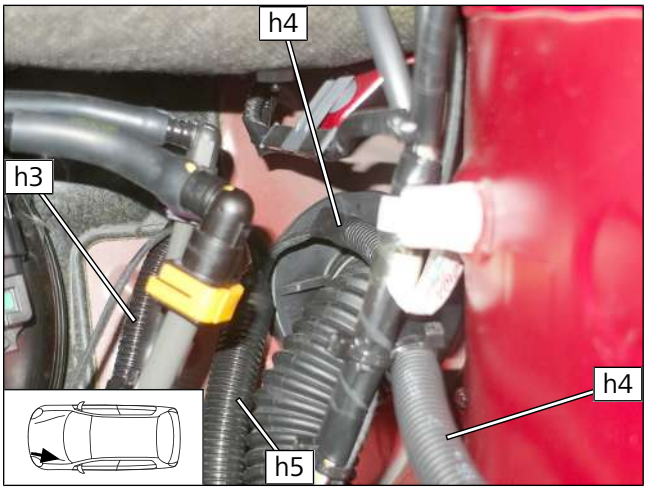


Fig. 29

▶ Position corrugated tubes h3 and h5 on the firewall as shown.

Routing corrugated tube h4

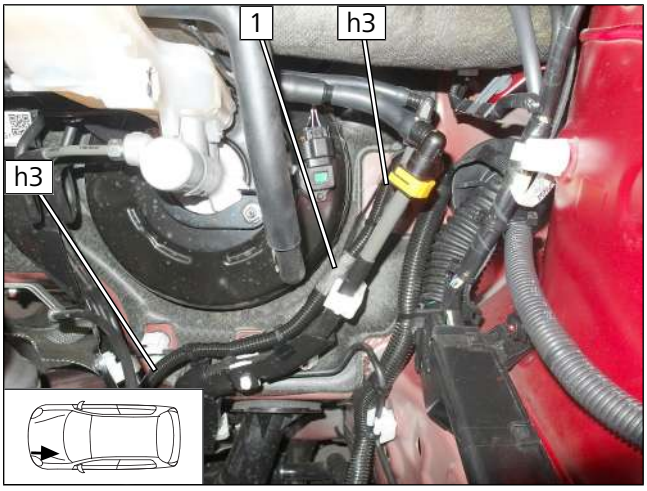


Fig. 30

▶ Align premounted foam 1 with line holder as shown.

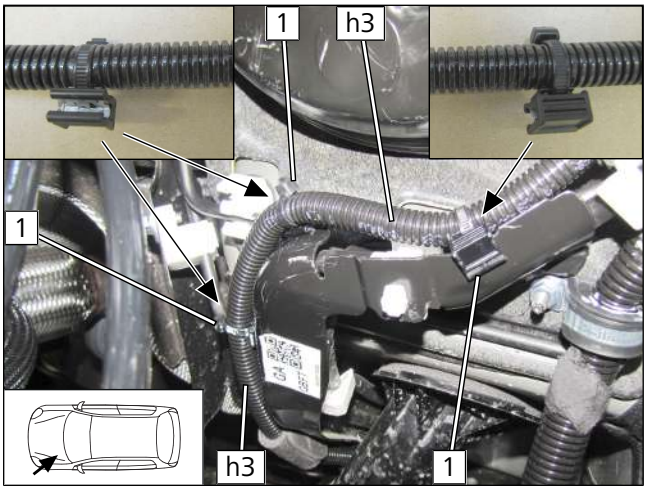


Fig. 31

1 Edge clip cable tie

Routing corrugated tube h6

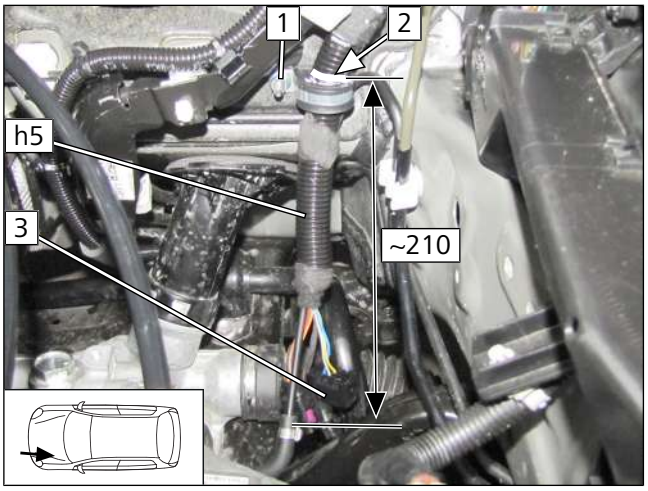


Fig. 32

The mark made during preliminary work is located at position 2.

▶ Route corrugated tube h5 with heater and coolant pump wiring harness and fuel line as shown and fasten with stretched length of 210 with rubber-coated p-clamp.

1 Original vehicle stud bolt, rubber-coated Ø25 pipe clamp, flanged nut

3 Heater and coolant pump wiring harness connector as well as fuel line with premounted 90° moulded hose

Mounting SH2

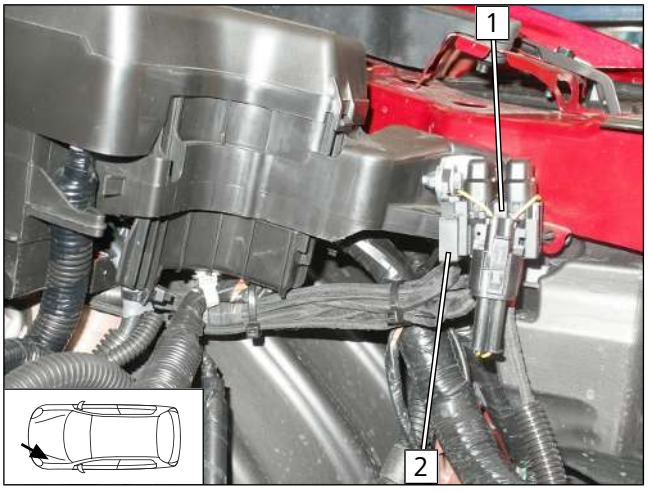


Fig. 33

1 Fuses F1-2

2 Premounted fuse holder retaining plate

Earth wire connection

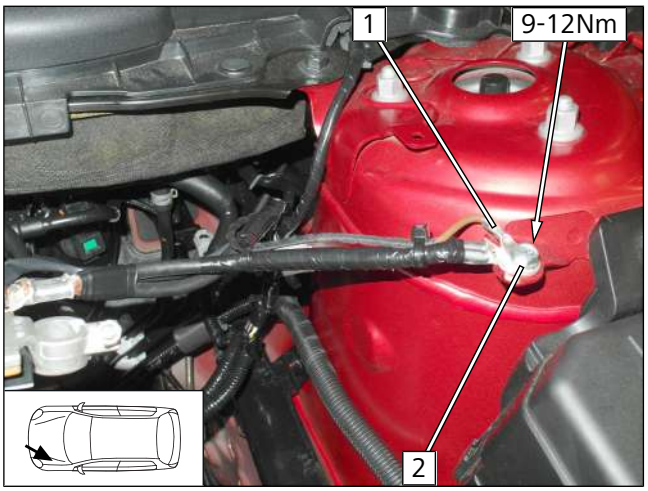


Fig. 34

DANGER

Fire hazard due to insufficient tightening torque

▶ Observe tightening torque

1 Earth wire at earth support point

2 Original vehicle bolt at earth support point

Positive wire connection

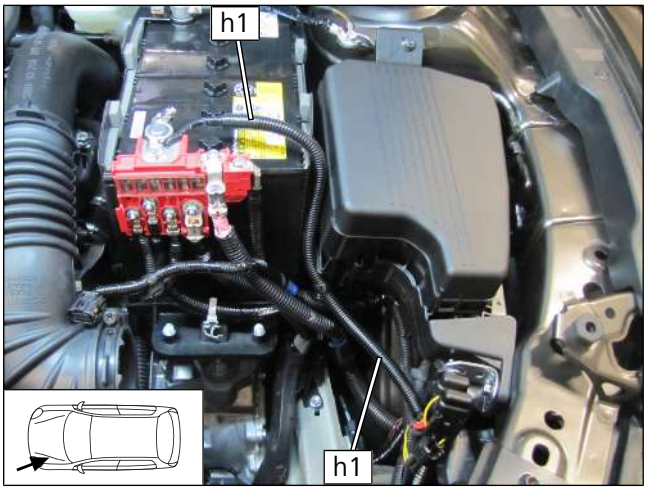


Fig. 35

For connection to positive battery terminal, see 'Final work in engine compartment' section

▶ Route red (rt) wire of B+ in Ø10 corrugated tube **h1** to positive battery terminal.

Routing wiring harnesses in passenger compartment

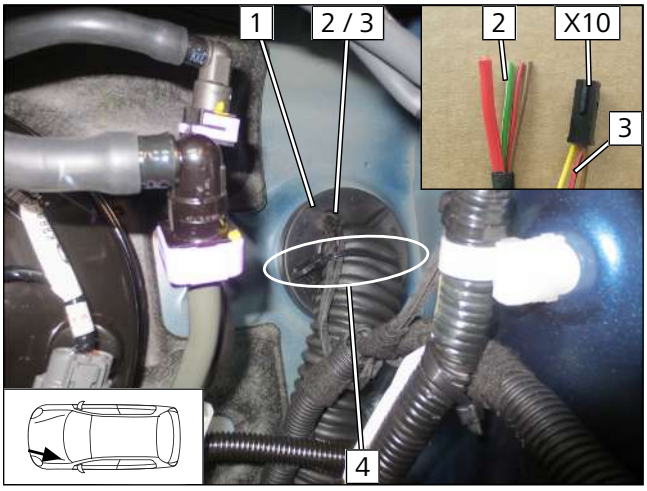


Fig. 36

Afterwards, seal the protective rubber plug with silicone.

▶ Route wires for passenger compartment **2** and wiring harness of control element **3** through protective rubber plug **1** into the passenger compartment.

4 Cable tie

8 Mechanical system

8.1 Premounting heater

Preparing heater

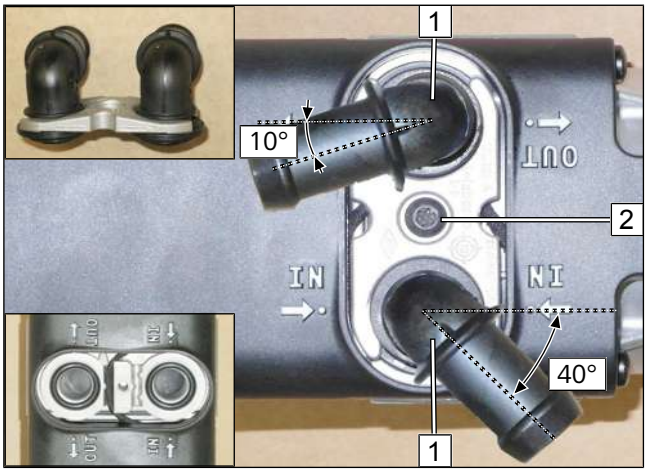


Fig. 37

Observe the general installation instructions of the heater.

[1] Water connection piece, seal

[2] 5x15 self-tapping bolt, water connection piece retaining plate

Premounting bolts loosely

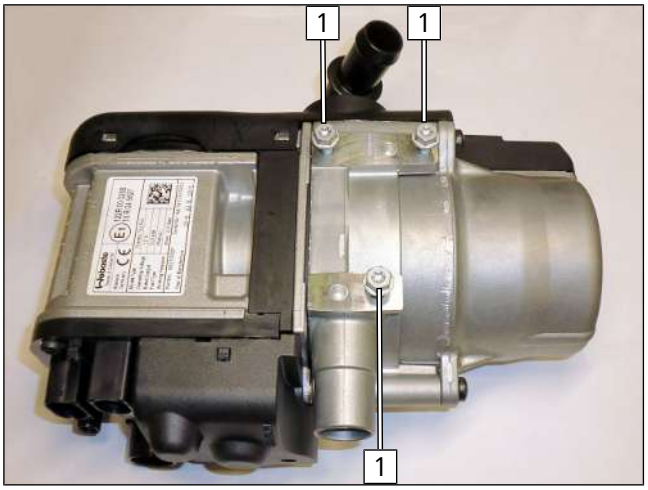


Fig. 38

Screw 5x13 self-tapping bolt [1] in available holes by a max. of 3 thread turns.

Premounting heater

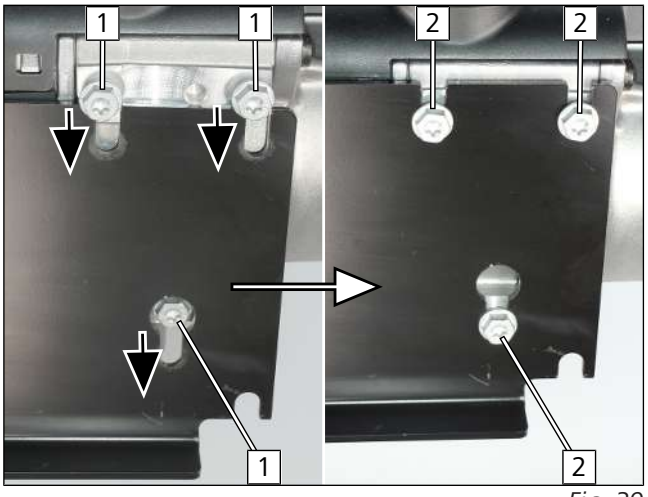


Fig. 39

[1] Insert premounted 5x13 self-tapping bolts [3x] in oblong holes of the bracket, part 1

[2] Tighten 5x13 self-tapping bolts [3x] (8Nm)

Cutting combustion air intake pipe to length

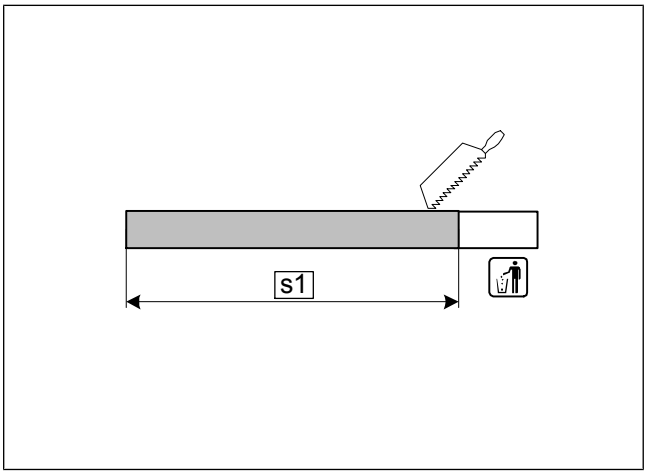


Fig. 40

s1 240

Mounting combustion air intake pipe **s1**

Fig. 41

Observe the installation instructions of the combustion air intake silencer.

1 Combustion air intake line

Premounting bracket part 2

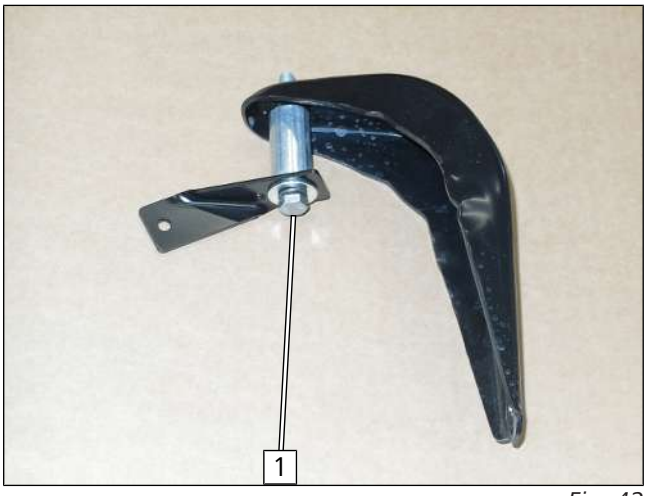


Fig. 42

1 Loosely mount M8x70 bolt, spring lockwasher, large diameter washer, bracket part 2, distance washer 40, original vehicle bracket

Premounting bracket loosely

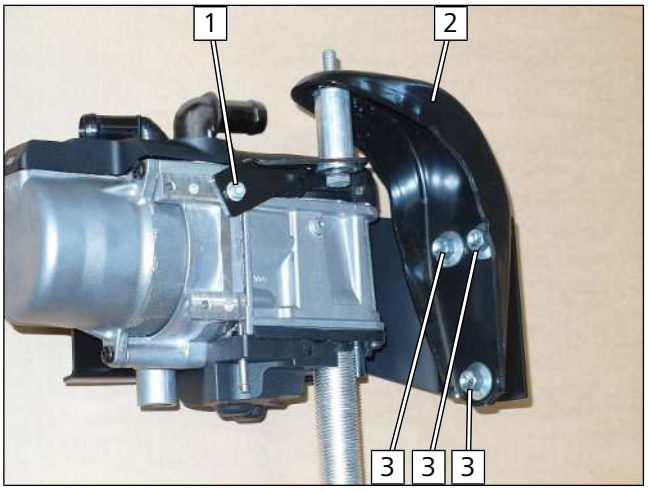


Fig. 43

▶ Insert original vehicle bolts for battery holder [3] as installation aid, remove again after premounting.

[1] Loosely mount M5x13 self-tapping bolt loosely, bracket part 2

[2] Original vehicle bracket, premounted

Cutting foam strip in half

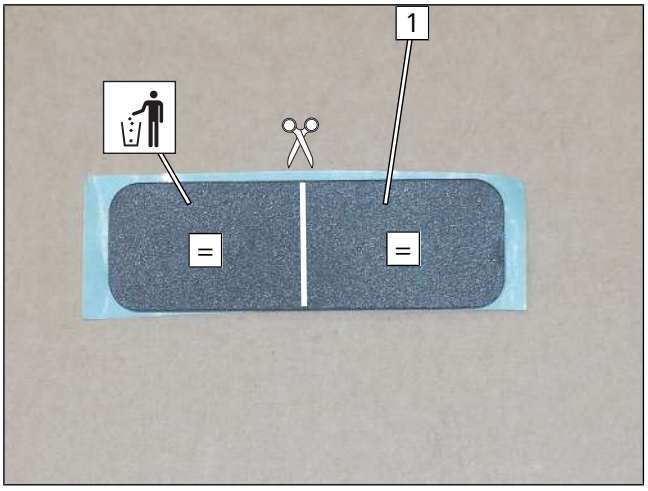


Fig. 44

[1] Self-adhesive foam

Gluing foam, bending combustion air intake pipe, mounting edge protection

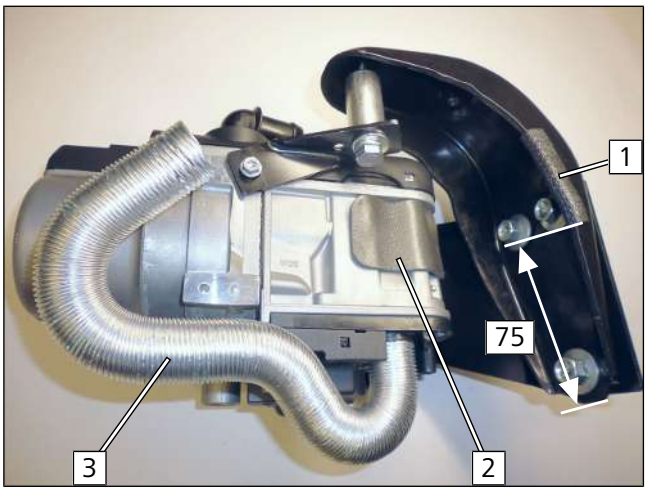


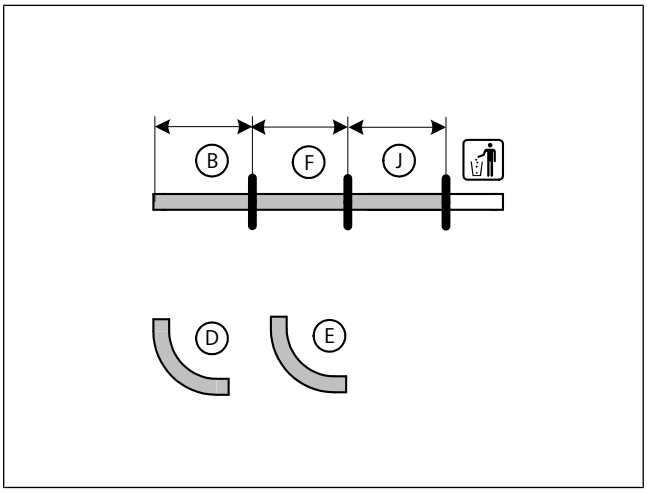
Fig. 45

[1] Edge protection 50

[2] Foam strips cut in half

[3] Combustion air intake line

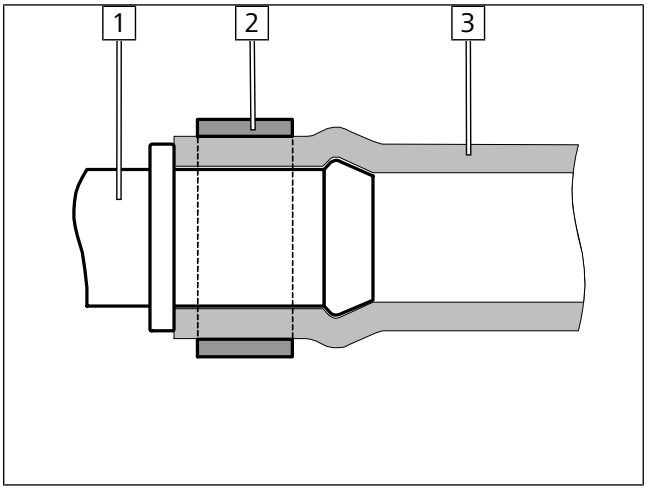
Cutting hoses to length



Ⓑ 70
Ⓓ 90°
Ⓔ 90°
Ⓕ 95
Ⓙ 60

Fig. 46

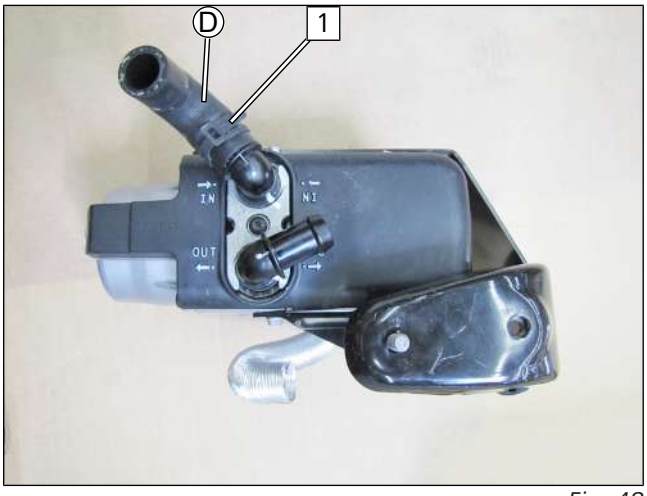
Installation instructions for hose, spring clip and connecting pipe



1 Connecting pipe
2 Spring clip
3 Hose

Fig. 47

Mounting hose Ⓓ



1 Ø25 spring clip

Fig. 48

8.2 Moving preheating relay

Dismantling original vehicle preheating relay

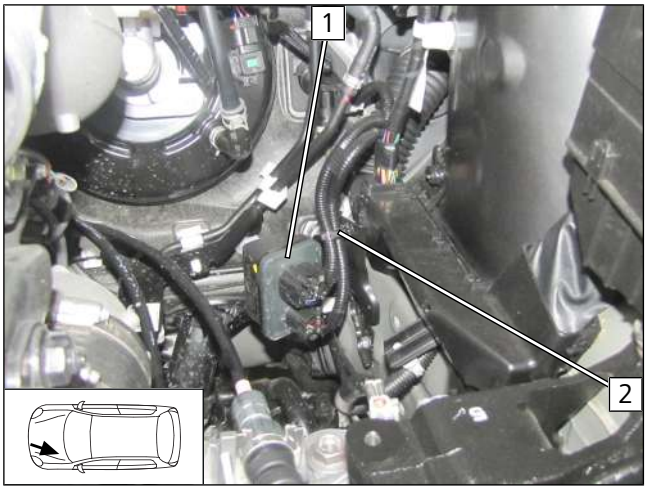


Fig. 49

▶ Dismantle original vehicle preheating relay [1] with the bracket. Remove wiring harness retaining clip [2] from the bracket.

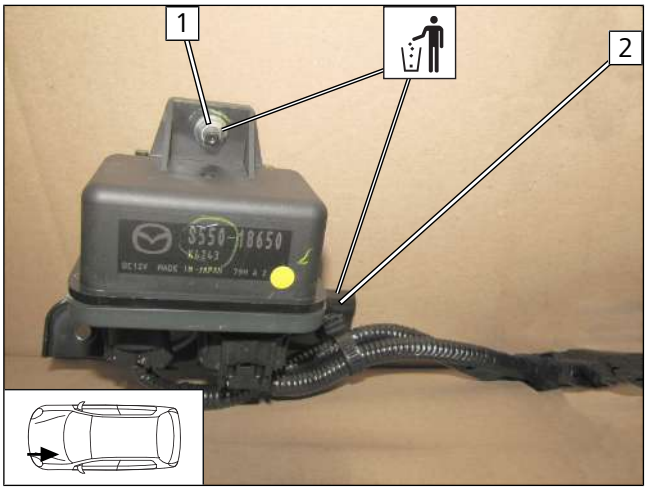


Fig. 50

Remove nut [1] and discard it with bracket [2].

Premounting two angle brackets

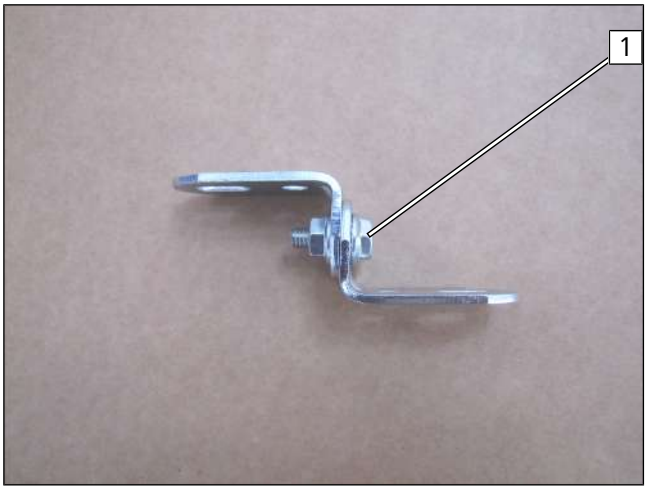


Fig. 51

[1] M6x16 bolt, angle bracket [2x], flanged nut (8-10Nm)

Mounting angle bracket

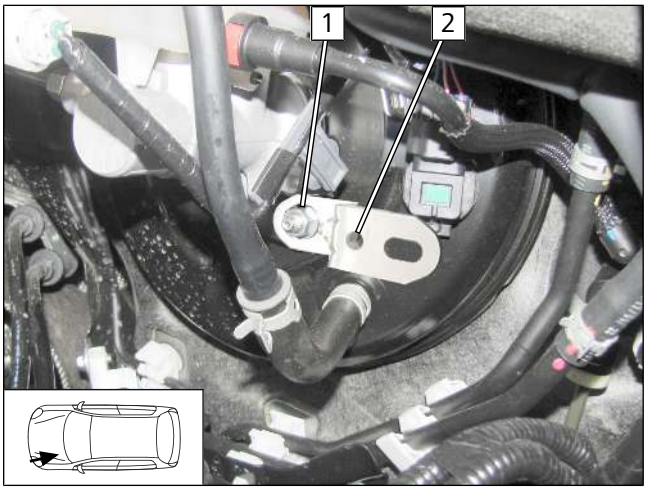


Fig. 52

Align angle bracket horizontally.

1 Original vehicle flanged nut, premounted angle bracket, original vehicle stud bolt (18-20Nm)

2 Hole for mounting original vehicle preheating relay at a later time

Mounting original vehicle preheating relay

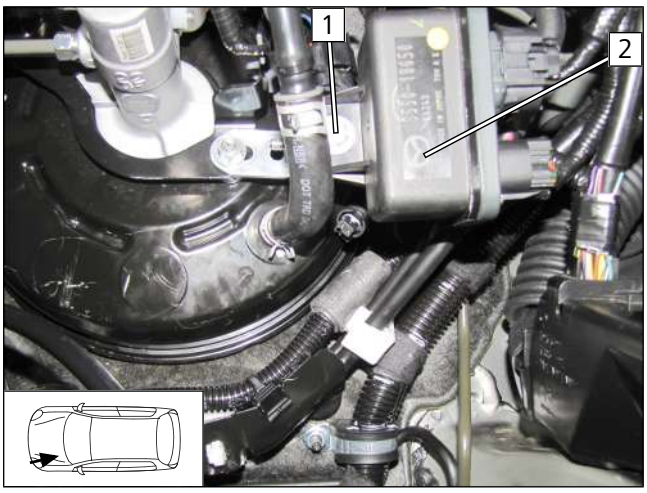


Fig. 53

▶ Align original vehicle preheating relay **2** vertically.

1 M6x16 bolt, large diameter washer, original vehicle preheating relay **2**, premounted angle bracket, flanged nut (8-10Nm)

Fastening wiring harness

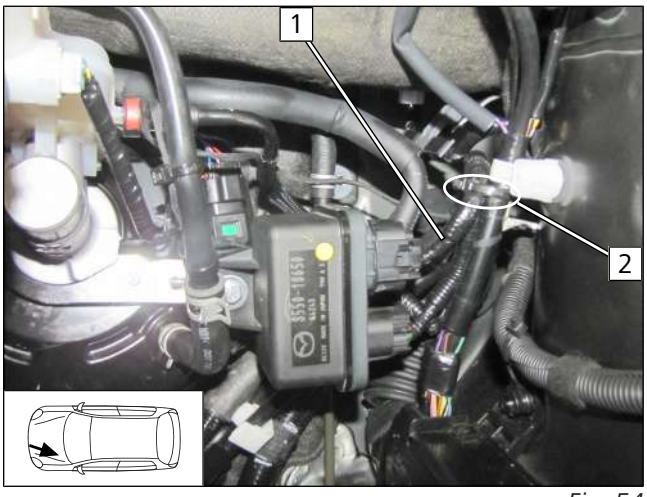


Fig. 54

Align preheating relay vertically

1 Original vehicle preheating relay wiring harness

2 Cable tie

8.3 Moving engine inlet hose

Reconnecting hose

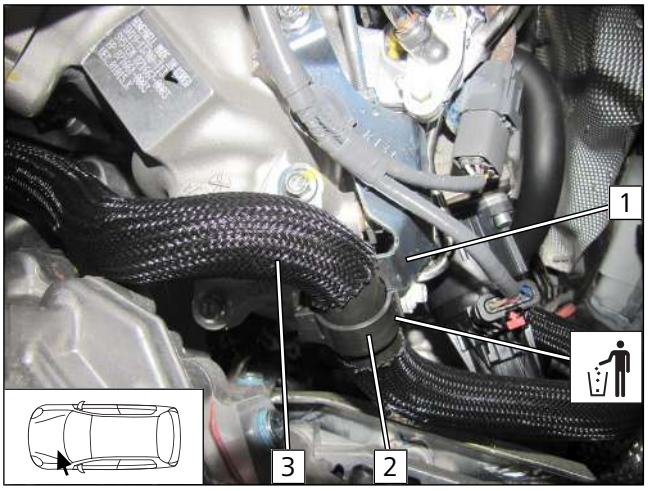


Fig. 55

▶ Detach original vehicle bracket [2] of coolant hose [3] from retaining bracket [1] and discard.

Mounting clamping nut

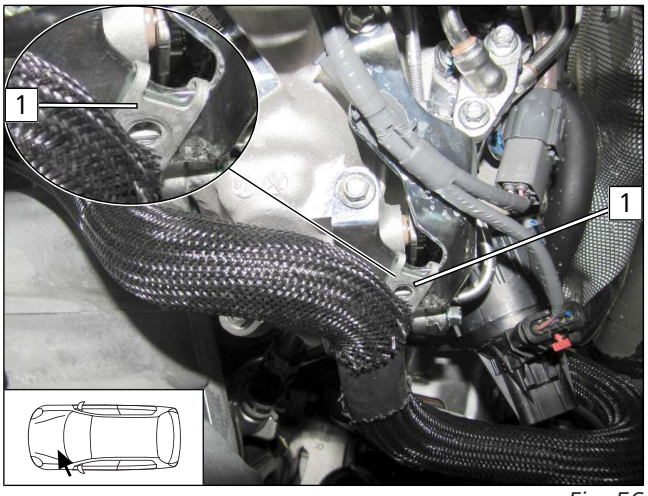


Fig. 56

[1] Clamping nut

Installing hose

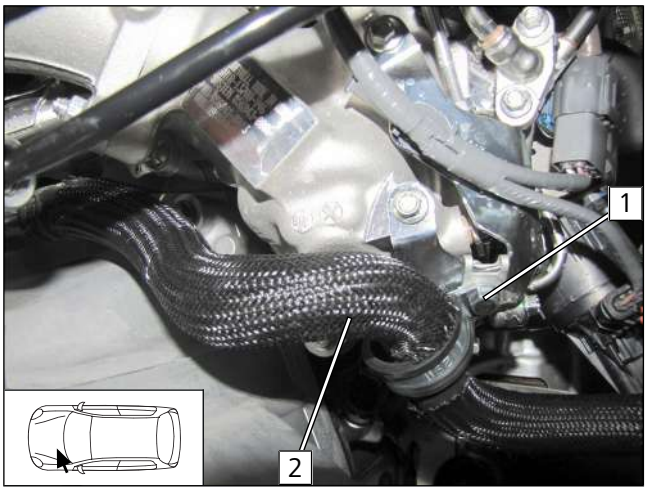


Fig. 57

[1] M6x16 bolt, Ø29 rubber-coated p-clamp (8Nm)

[2] Original vehicle coolant hose

8.4 Mounting heater

Mounting connectors for wiring harnesses

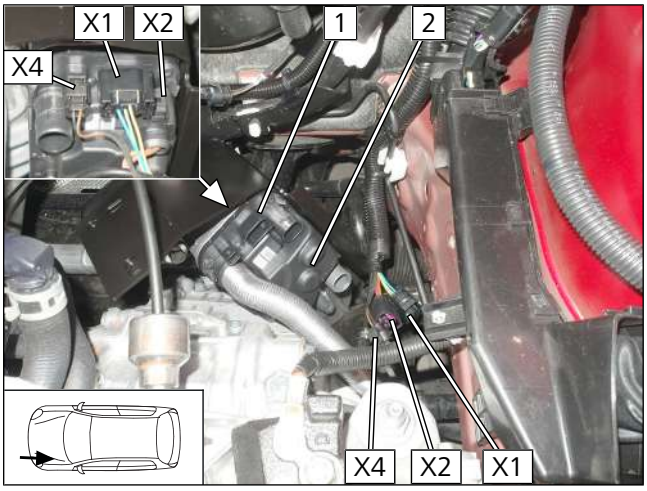


Fig. 58

▶ Place heater [2] with premounted brackets as shown in the engine compartment. Mount connector [X1] / [X2] of heater wiring harness and connector [X4] of coolant pump wiring harness.

[1] Heater position receptacles

Mounting fuel line

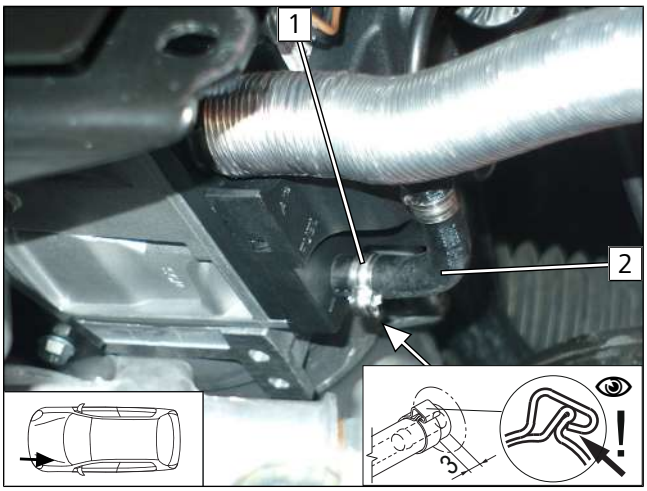


Fig. 59

[1] Ø10 clamp

[2] 90° moulded hose, premounted

Mounting heater

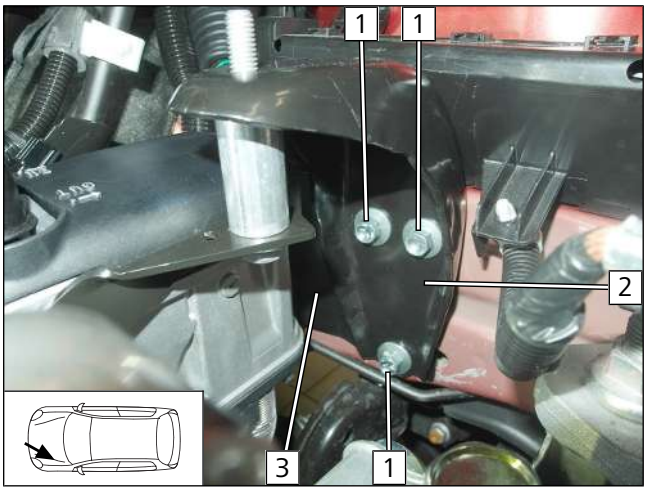


Fig. 60

▶ Move heater into installation position. Align holes of original vehicle bracket [2] and heater bracket part 1 [3] exactly.

[1] Original vehicle bolt (25Nm)

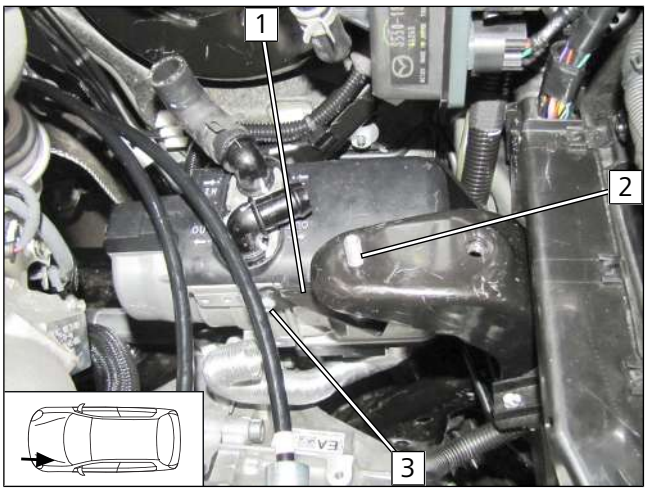


Fig. 61

▶ Align bracket part 2 [1] against original vehicle bracket.

[2] Tighten bolt (20Nm)

[3] 5x13 self-tapping bolt [8Nm]

Checking distance

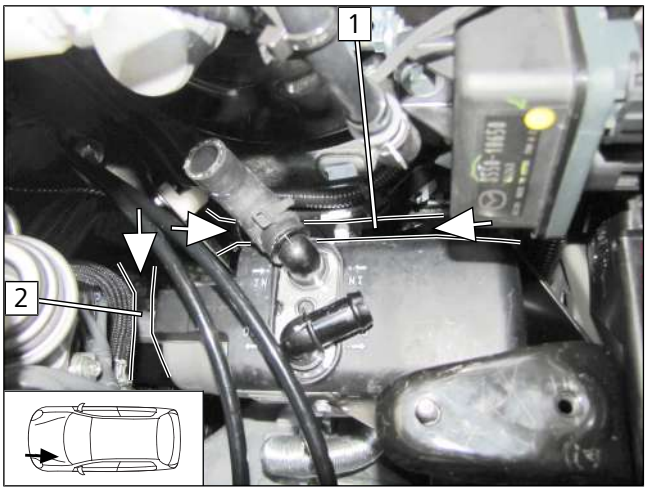


Fig. 62

Ensure sufficient distance to neighbouring components at position [1], adjust if necessary.

>10

Ensure sufficient distance to neighbouring components at position [2], adjust if necessary.

>20

Refilling coolant

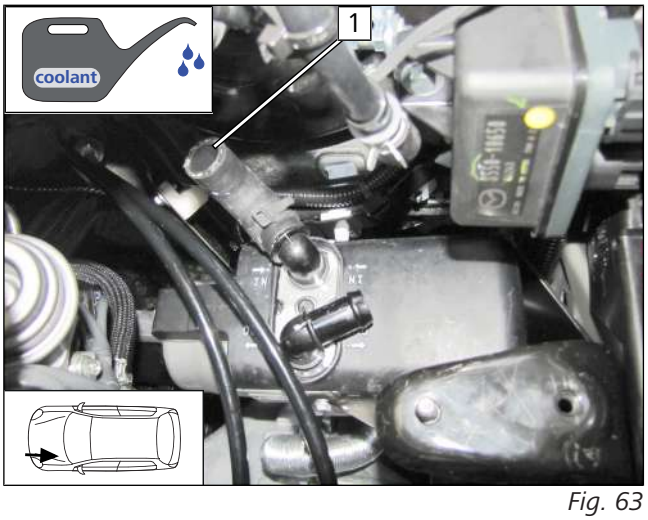


Fig. 63

Only use manufacturer-approved coolant.

▶ Before continuing the installation of the coolant hoses, fill the heater with coolant using heater inlet connection piece 'IN' [1].

Cutting hose section lengthwise

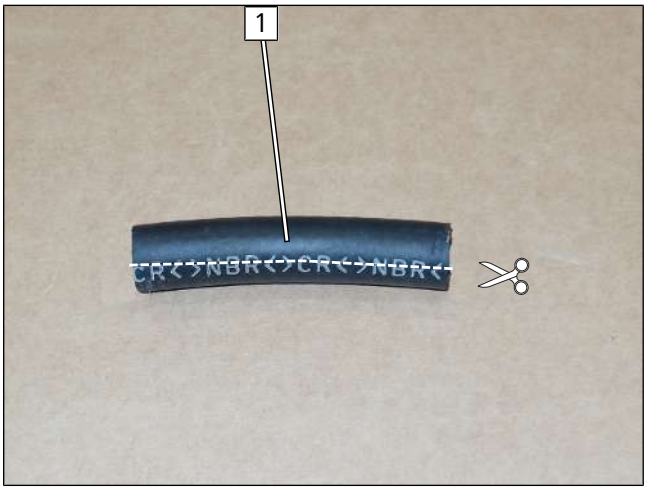


Fig. 64

1 70 hose section

Mounting hose section

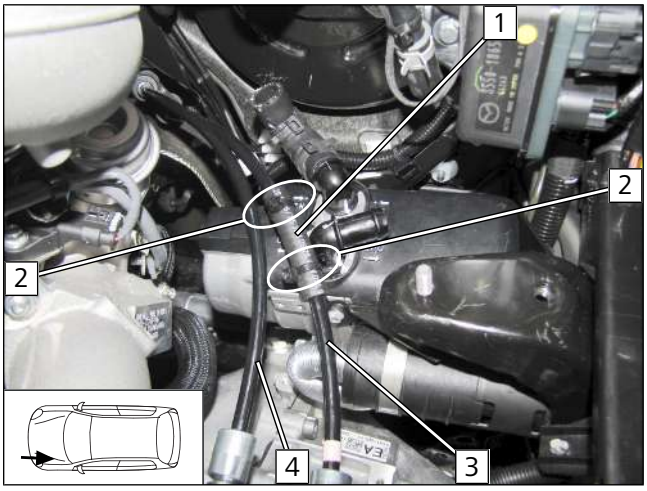


Fig. 65

1 Slit hose section

2 Cable tie

3 Gearshift cable

4 Gearshift cable (only in case of manual transmission)

Routing coolant pump wiring harness

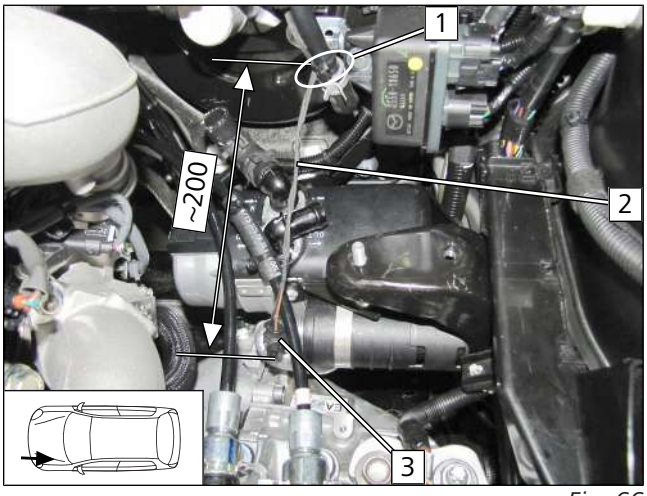


Fig. 66

▶ Route coolant pump wiring harness **2** as shown and fasten using cable tie **1**.

3 Coolant pump wiring harness connector

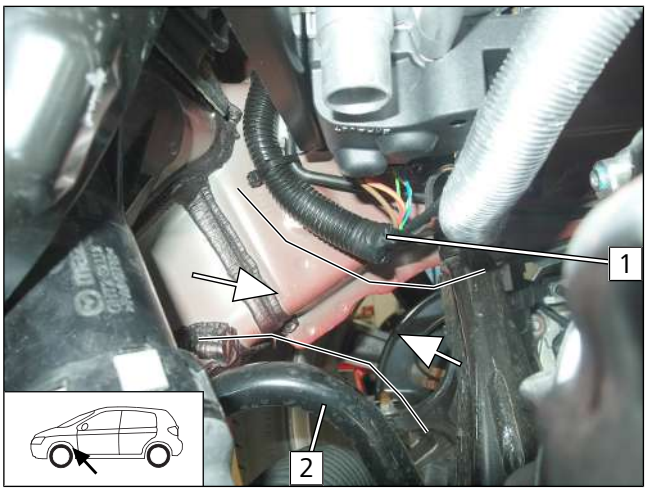


Fig. 67

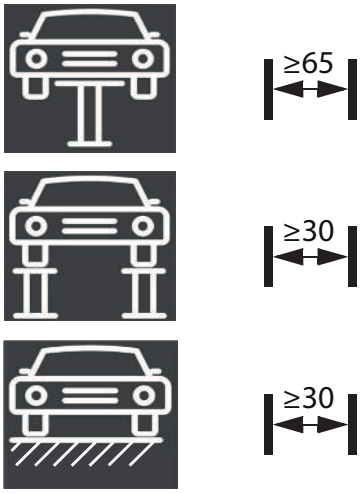
- Ensure sufficient distance between stabiliser bar and wiring harness, fuel line and combustion air line and if necessary, correct as shown below.

  1 Heater wiring harness and fuel line

  2 Stabiliser bar

View of distance control

Fig. 68



9 Combustion air

Premounting combustion air intake silencer

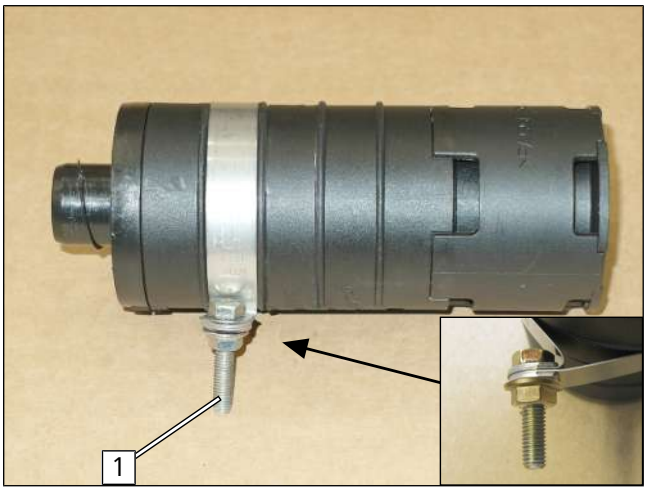


Fig. 69

1 M5x20 bolt, Ø51 clamp (shape as shown), flanged nut (5-6Nm)

Mounting combustion air intake pipe **s1** to combustion air intake silencer

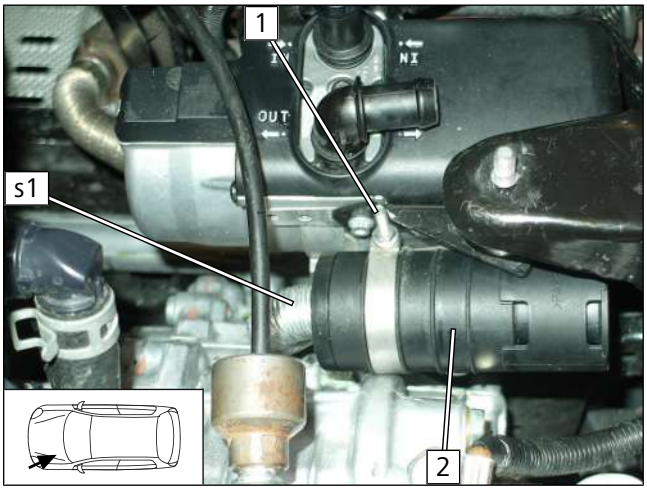


Fig. 70

Observe the installation instructions of the combustion air intake silencer.

1 Position premounted clamp

2 Combustion air intake silencer

Mounting combustion air intake silencer

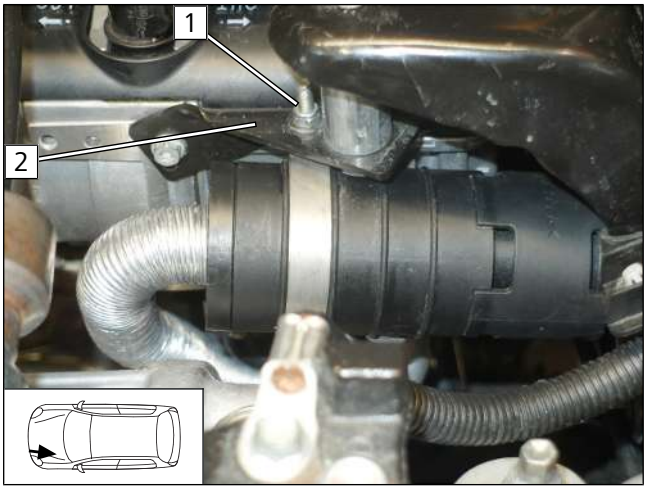


Fig. 71

1 M5x25 bolt, Ø 51 clamp, premounted flanged nut, self-locking nut (5-6Nm)

2 Bracket part 2

Checking distance between combustion air intake silencer and transmission

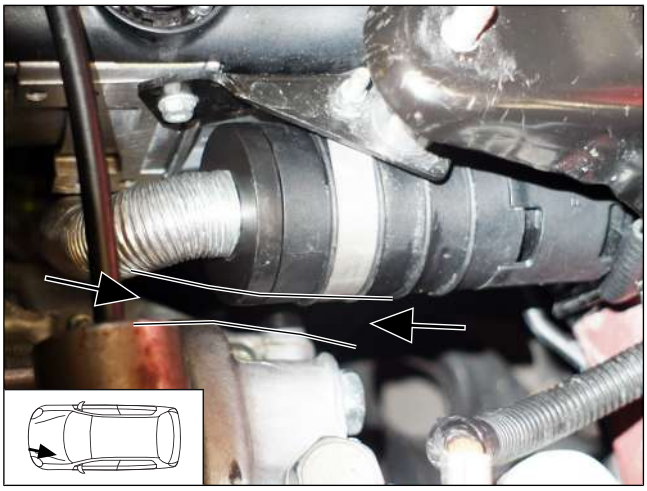


Fig. 72

Ensure sufficient distance from neighbouring components, correct if necessary.

>15

10 Coolant

10.1 Hose routing diagram

'Inline' coolant circuit

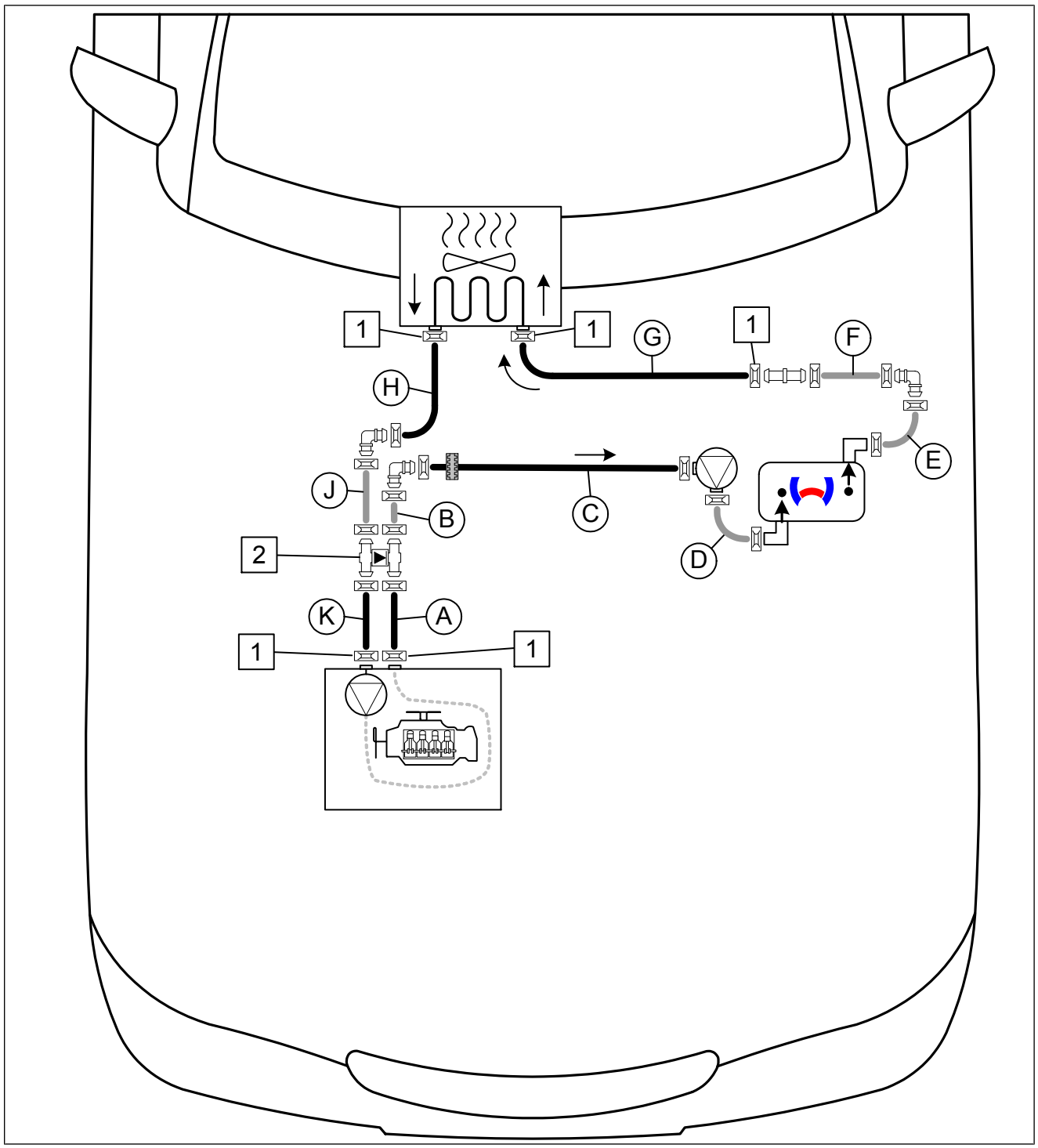


Fig. 73

All spring clips without a specific designation = Ø25

All connecting pipes and = Ø18x18

1 Original vehicle spring clip ; 2 Non-return valve = 4xØ18

10.2 Preparing hose group

View of original coolant hose

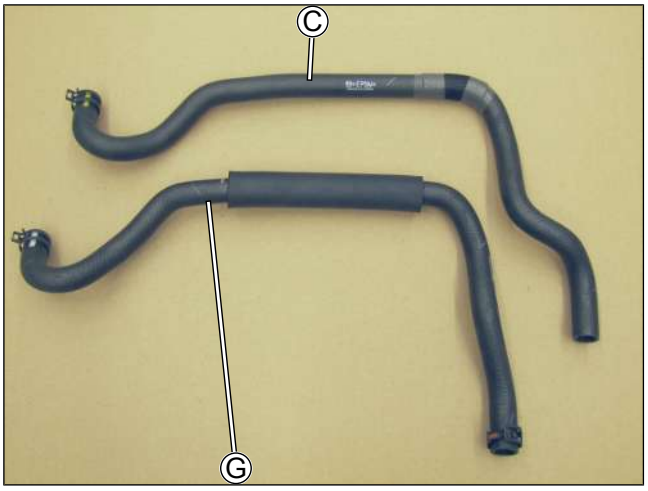


Fig. 74

Ⓒ Original Mazda coolant hose GRG1-61-24X
Ⓖ Original Mazda coolant hose GRG1-61-24Y

Preparing coolant hose Ⓒ

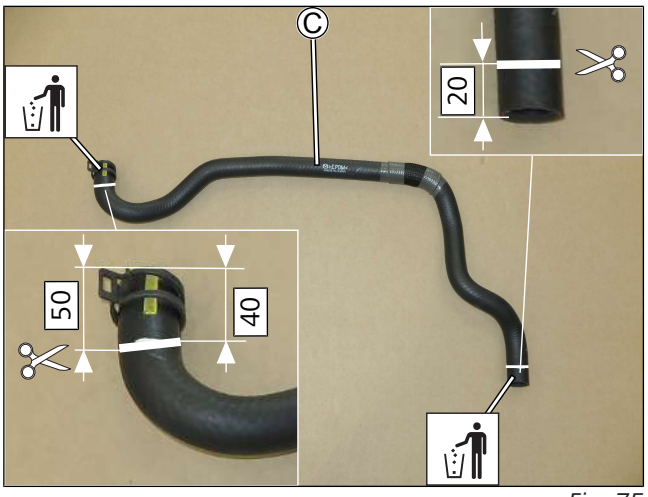


Fig. 75

Drawing markings

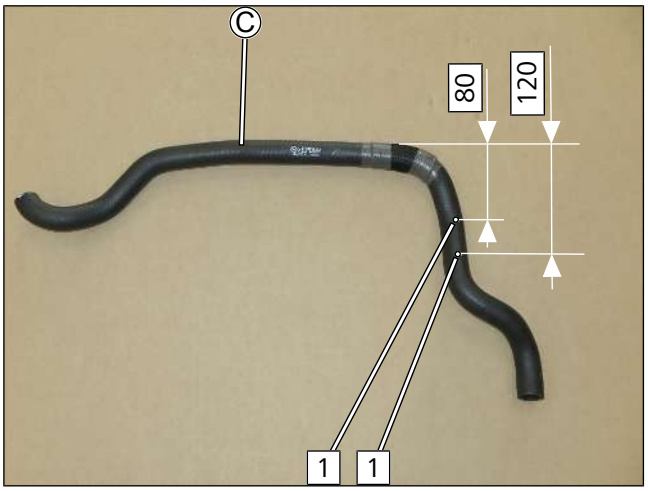


Fig. 76

1 Markings for hose bracket installation

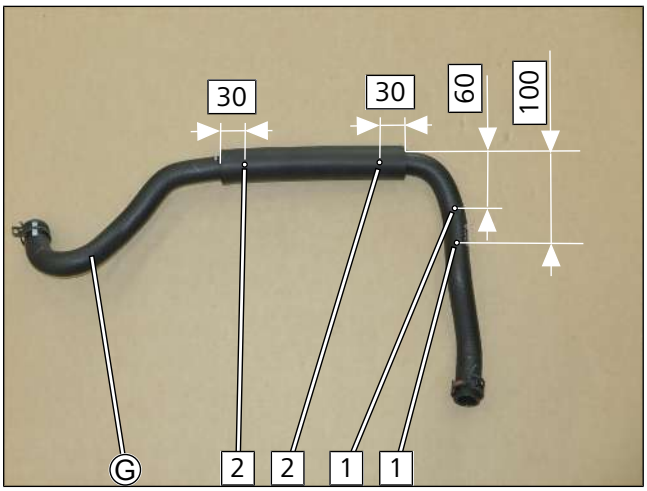


Fig. 77

1 Markings for hose bracket installation
2 Markings for fabric heat shrink tubings installation

Mounting hose bracket

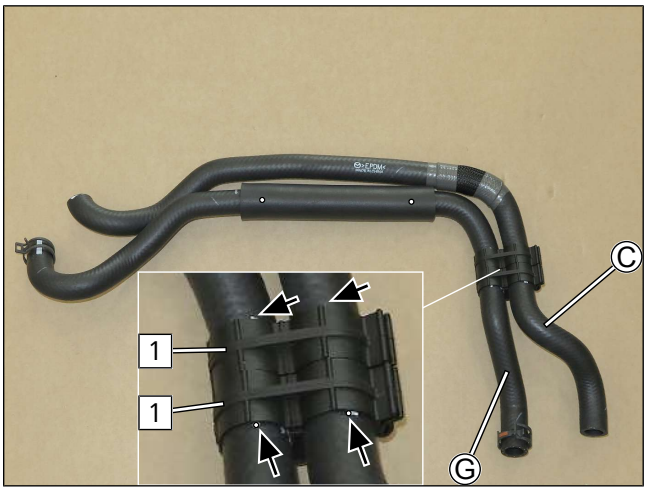


Fig. 78

▶ Mount hose bracket 1 between the markings as shown.

Cutting and labelling fabric heat shrink tubings

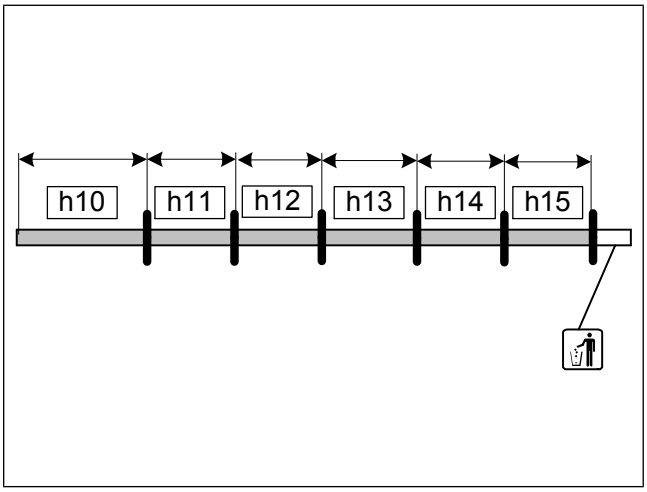


Fig. 79

Label the sections according to future use.

	Length	Used for
h10	400	Hose C
h11	120	Hose G
h12	120	Hose G
h13	190	Hose G
h14	170	Hose C
h15	150	Hose G

Pulling up fabric heat shrink tubings

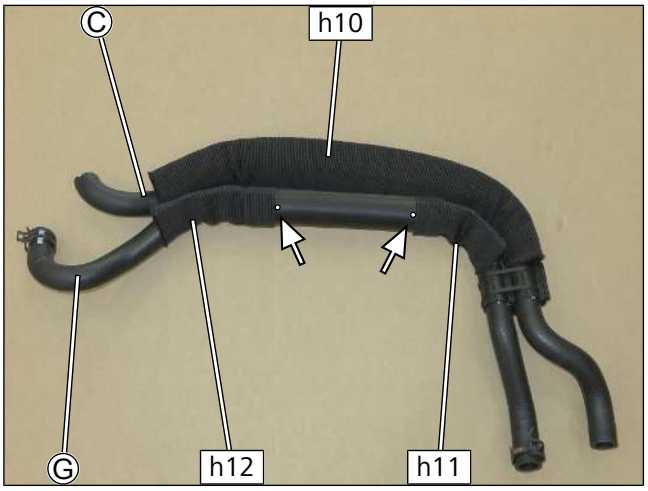


Fig. 80

- ▶ Pull up fabric heat shrink tubing **h10** up to the hose bracket as shown.
- ▶ Pull up fabric heat shrink tubing **h11** between the hose bracket and the mark as shown.
- ▶ Pull up fabric heat shrink tubing **h12** up to the mark as shown.

Shrinking fabric heat shrink tubings

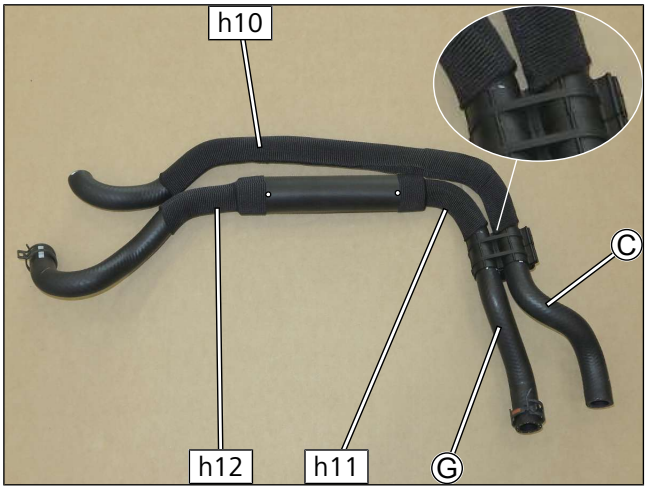


Fig. 81

Use 230°C at most to shrink fabric heat shrink tubings **h10** (430), **h11** (120) and **h12** (120).

Drawing markings

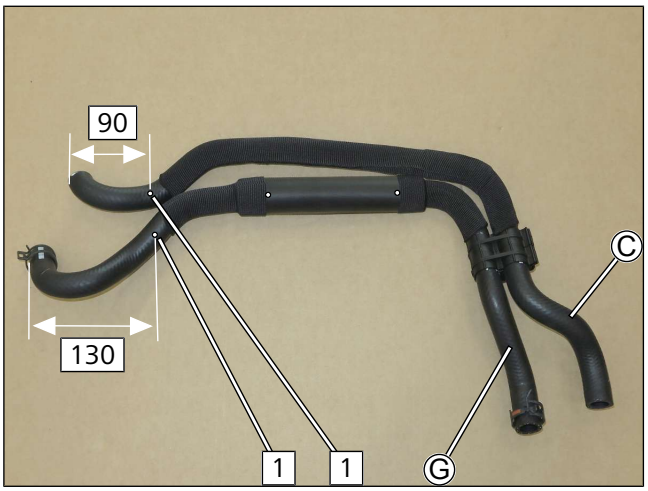


Fig. 82

1 Markings for hose bracket installation

Mounting hose bracket

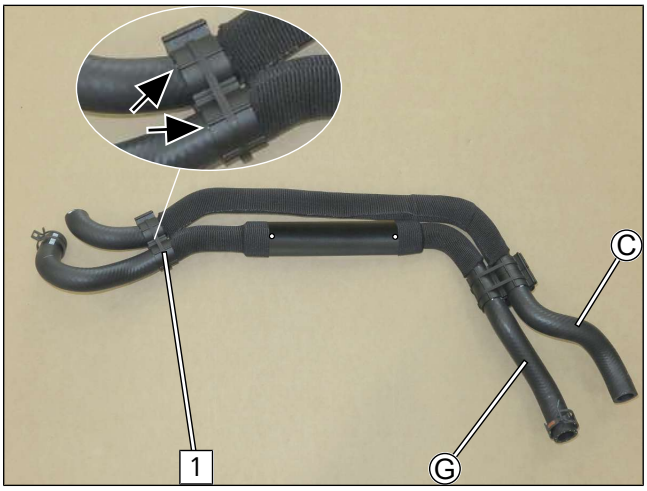


Fig. 83

▶ Mount hose bracket **3** between the markings as shown.

1 Hose bracket

Pulling up fabric heat shrink tubings

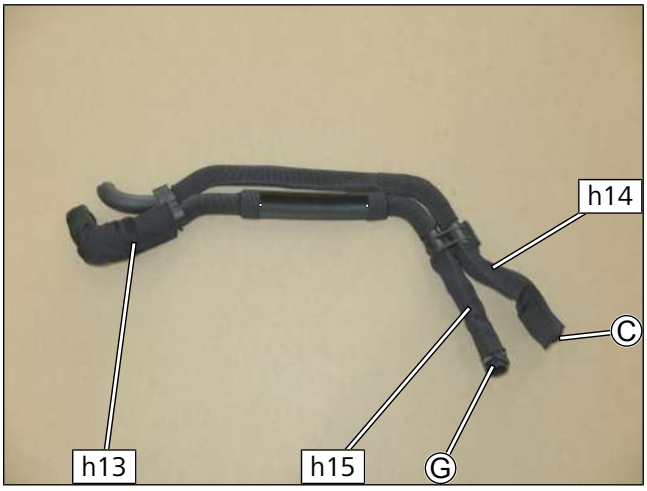


Fig. 84

▶ Pull up the fabric heat shrink tubings up to the hose bracket as shown.

Shrinking fabric heat shrink tubings

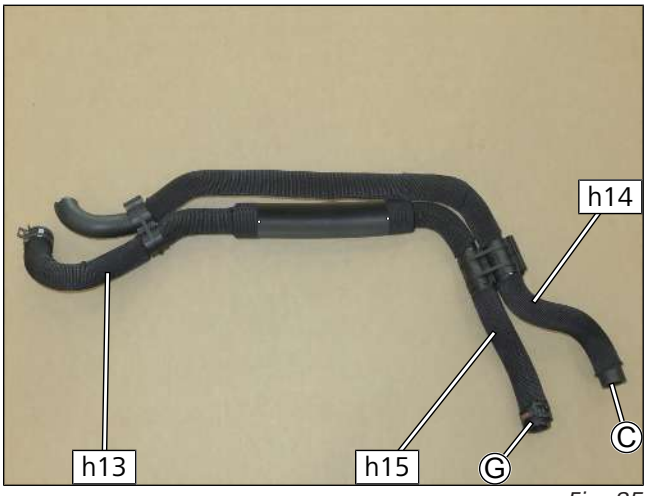


Fig. 85

Use 230°C at most to shrink fabric heat shrink tubings **h13** (190), **h14** (170) and **h15** (150).

Mounting hose (E) and (F)

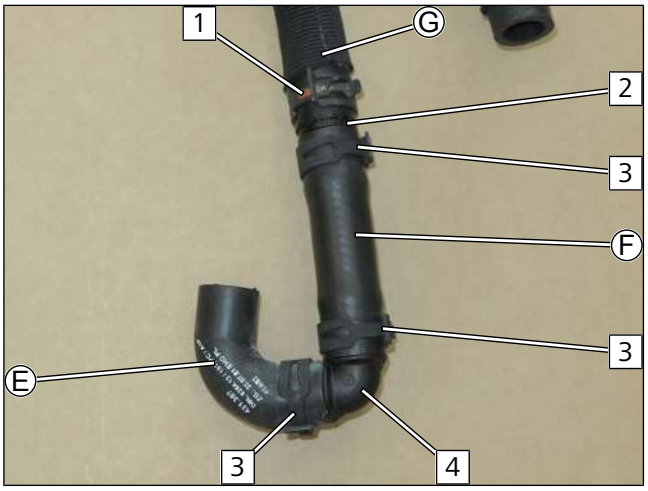


Fig. 86

1 Original vehicle spring clip
2 18x18 connecting pipe
3 Ø25 spring clip
4 90°, 18x18 connecting pipe

Preparing coolant pump mount

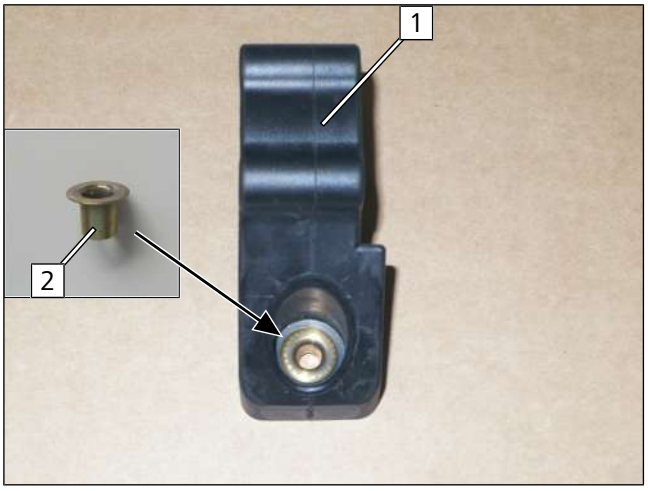


Fig. 87

1 Coolant pump mount
2 Sleeve

Premounting coolant pump

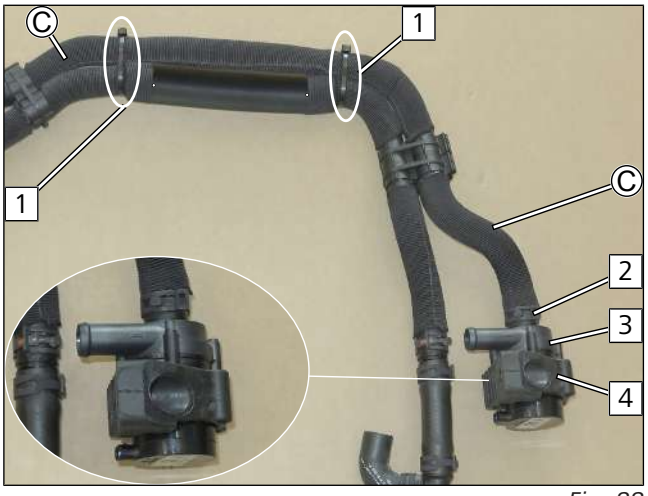


Fig. 88

1 Cable tie
2 Ø25 spring clip
3 Coolant pump
4 Coolant pump mount

Enlarging hole in perforated bracket, bending and twisting perforated bracket

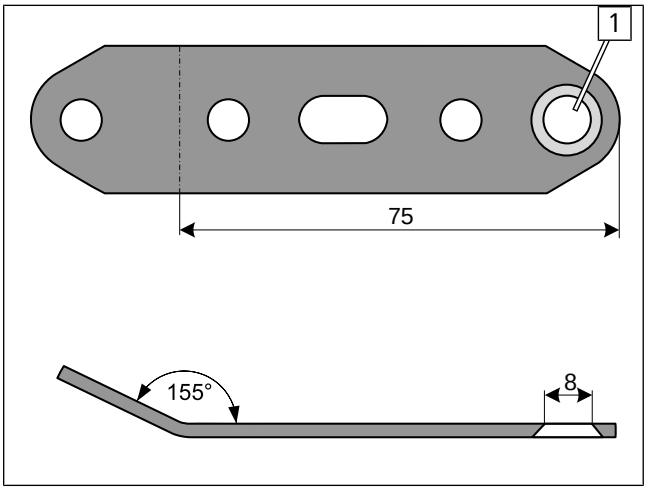


Fig. 89

Step 1

- ▶ Drill hole at position 1 to Ø8 and countersink hole as shown.
- ▶ Bend perforated bracket.

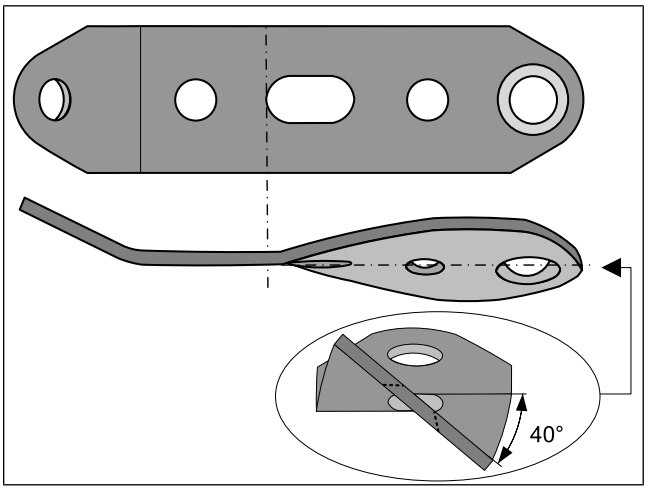


Fig. 90

Step 2

- ▶ Twist perforated bracket as shown.

Installing perforated bracket

Fig. 91

- ▶ Mount perforated bracket onto hose bracket 1 as shown in this and the next figures and align it.

  2 Top retaining clip of hose bracket, perforated bracket with countersunk hole

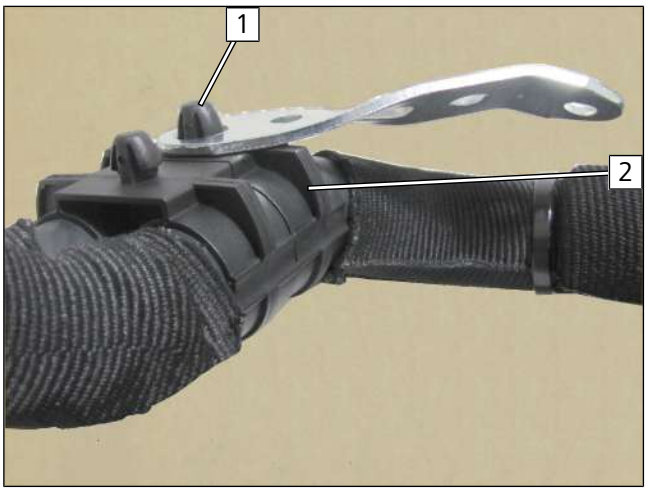


Fig. 92

[1] Top retaining clip of hose bracket, perforated bracket with countersunk hole

[2] Top hose bracket

10.3 Installing hose group

Detaching original vehicle heat shield plate

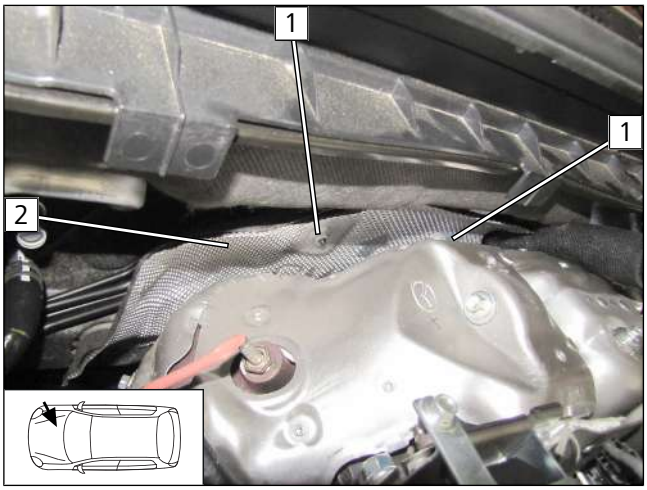


Fig. 93

▶ Remove original vehicle nuts [1] and lean heat shield plate [2] forwards against the engine.

Routing hose group

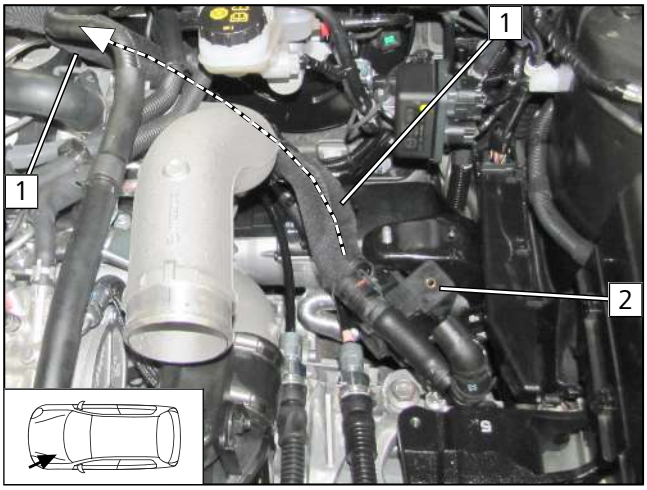


Fig. 94

▶ Route premounted hose group [1] from heater installation location to the firewall as shown in this and the two following figures.

[2] Coolant pump

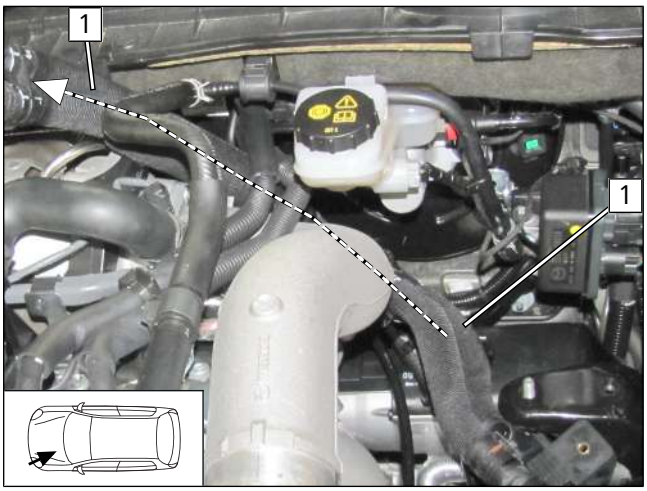


Fig. 95

▶ Route premounted hose group 1 under the brake booster to the firewall.

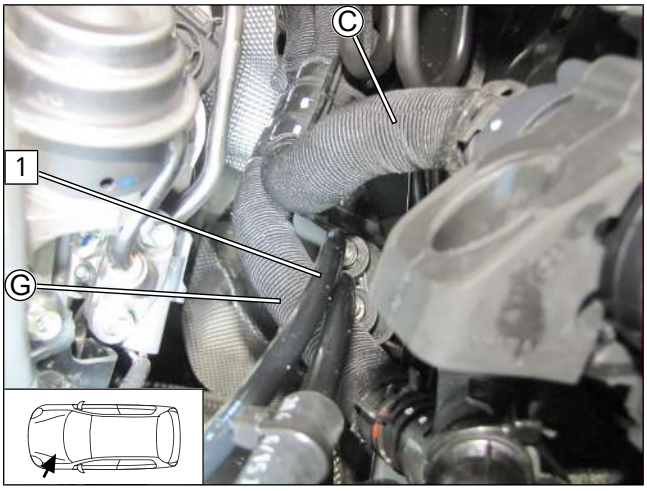


Fig. 96

Figure shows a vehicle with manual transmission

▶ Route hose C above and hose G under gearshift cable 1.

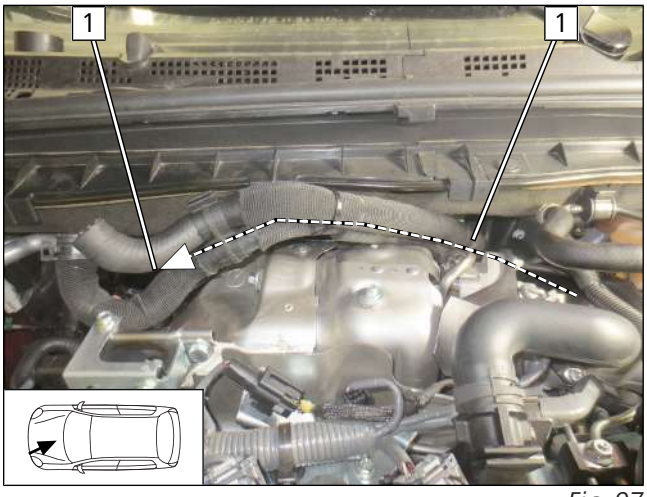


Fig. 97

▶ Route premounted hose group 1 on the firewall as shown.

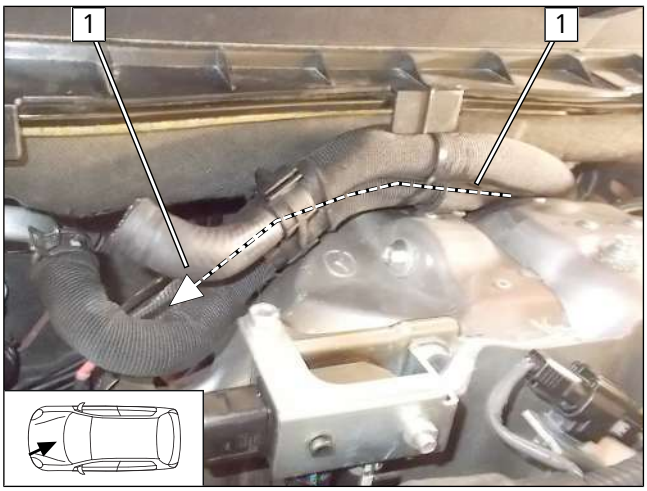


Fig. 98

▶ Route premounted hose group **1** on the firewall as shown.

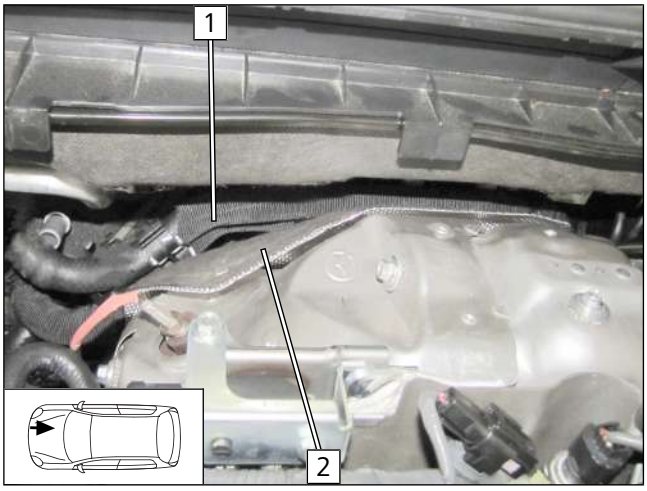


Fig. 99

▶ Route hose group **1** behind heat shield plate **2** on the firewall and insert downwards into the available duct.

Heater outlet connection

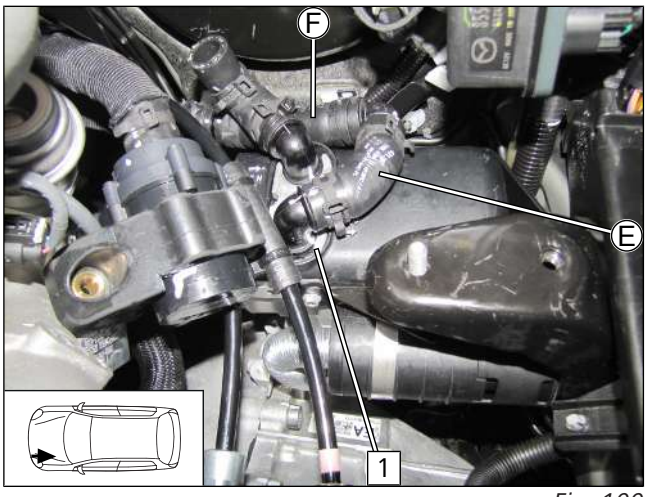


Fig. 100

1 Heater/OUT connection piece

Heater inlet connection

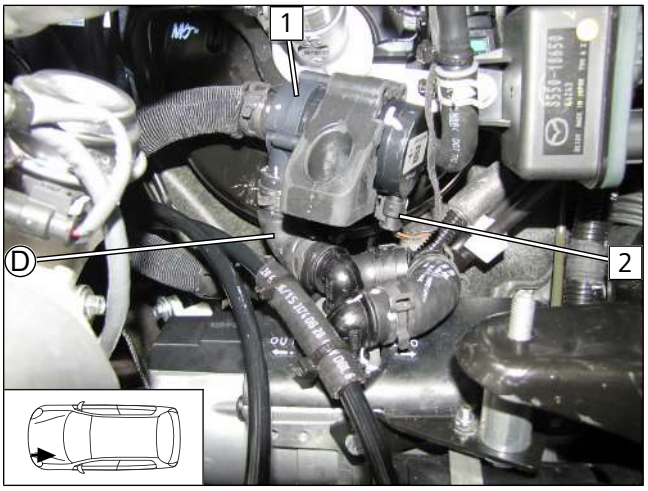


Fig. 101

1 Coolant pump
2 Coolant pump wiring harness connector

Disconnecting hoses of heat exchanger inlet and heat exchanger outlet

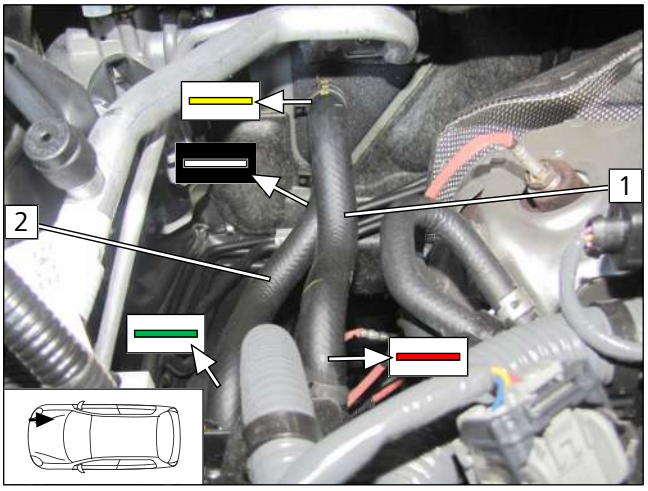


Fig. 102

▶ Please pay attention, during the next installation steps, to the original colour markings on the hoses.
⇨ Yellow for the heat exchanger inlet
⇨ White for the heat exchanger outlet
⇨ Green for the engine inlet
⇨ Red for the engine outlet

1 Hose of engine outlet / heat exchanger inlet on top
2 Hose of engine inlet / heat exchanger outlet below

Heat exchanger inlet connection

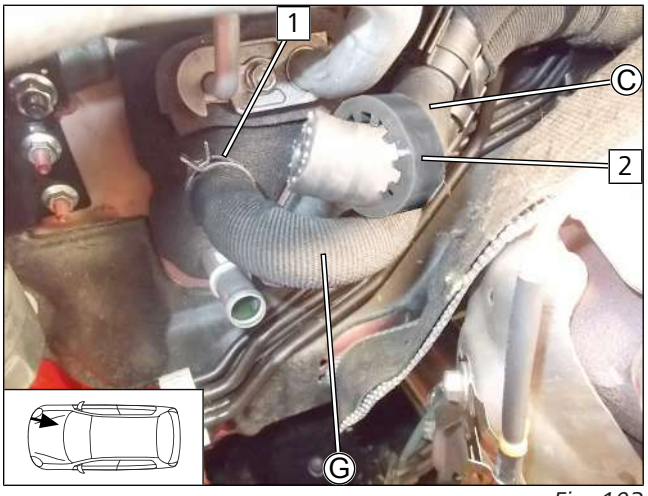


Fig. 103

▶ Premount black rubber isolator 2 onto hose C.

1 Heat exchanger inlet connection piece

Refilling coolant

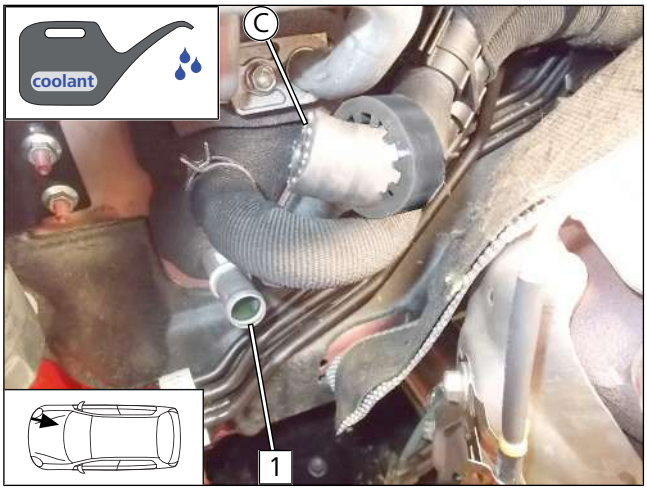


Fig. 104

Only use manufacturer-approved coolant.

▶ Before continuing the installation of the coolant hoses, fill the mounted hose assembly with coolant using hose (C), until the coolant comes out of connection piece [1].

Preparing heat exchanger inlet hose

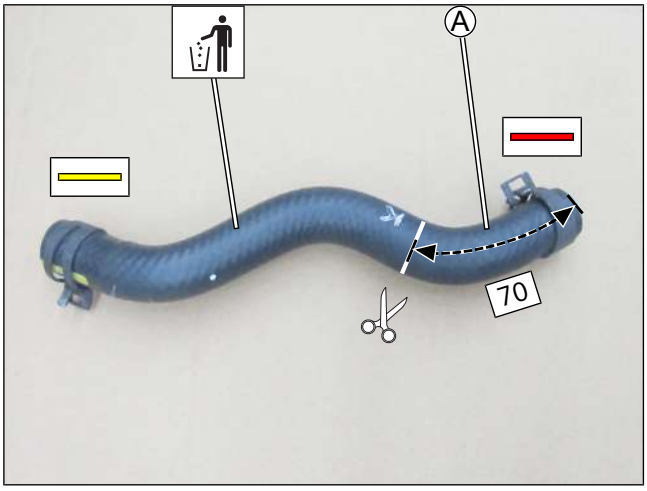


Fig. 105

(A) will be reused as engine outlet – non-return valve hose section

Preparing heat exchanger outlet hose

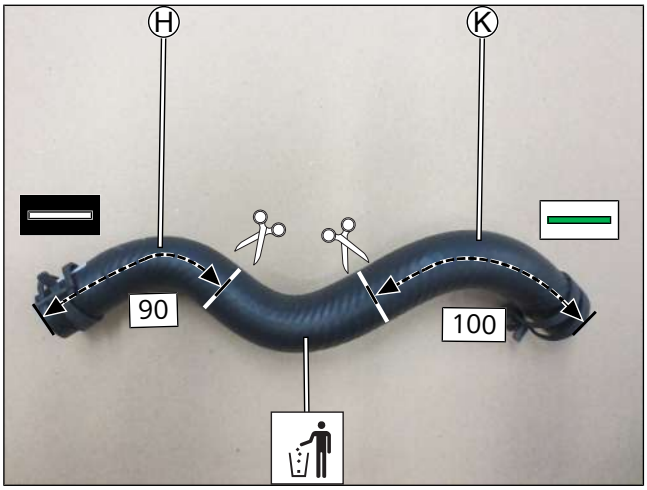


Fig. 106

(H) will be reused as hose section between hose (J) and heat exchanger outlet

(K) will be reused as engine inlet – non-return valve hose section

Premounting non-return valve

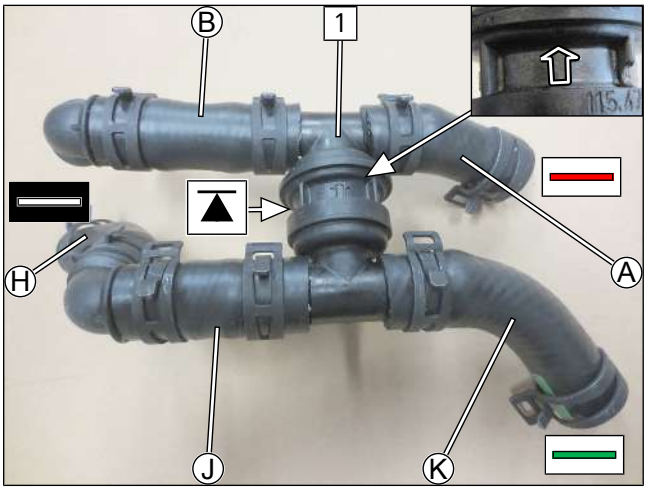


Fig. 107

Hose (B) = 70
Hose (J) = 60

▶ Align hoses as shown in the two following figures.

1 Ø4x18 non-return valve

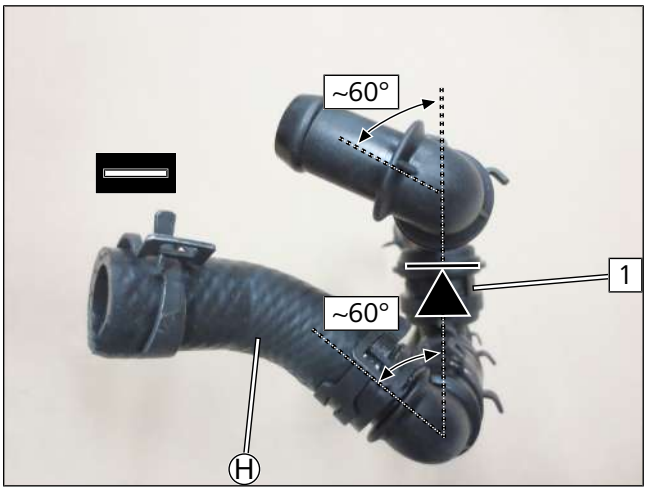


Fig. 108

1 4x Ø18 non-return valve

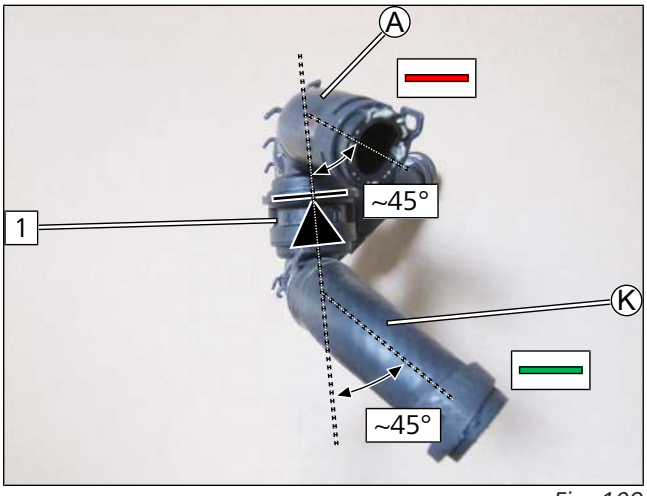


Fig. 109

1 4x Ø18 non-return valve

Mounting non-return valve

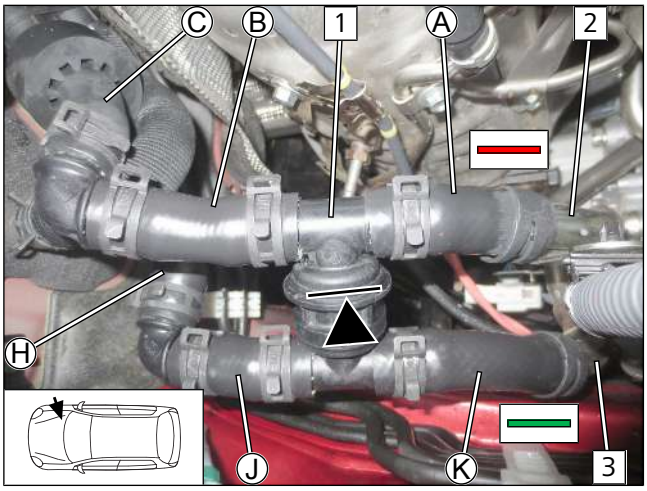


Fig. 110

1 Non-return valve
2 Engine outlet connection piece
3 Engine inlet connection piece

Heat exchanger outlet connection

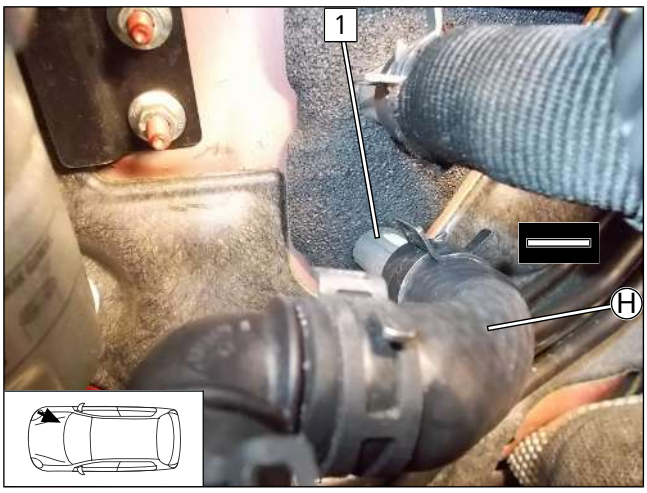


Fig. 111

1 heat exchanger outlet connection piece

Aligning rubber profile

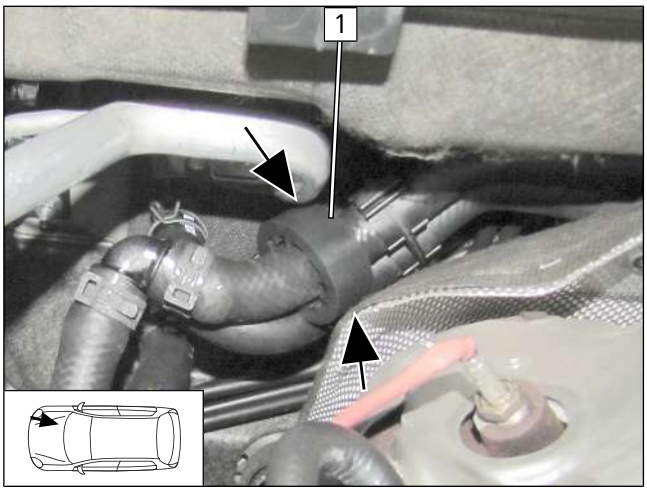


Fig. 112

▶ Align black rubber isolator as shown.

Preparing foam strip

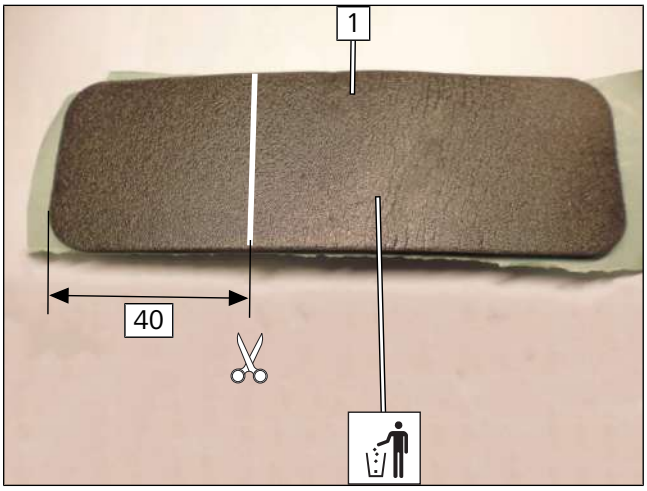


Fig. 113

▶ Cut a section from self-adhesive foam strip 1 as shown.

Installing perforated bracket

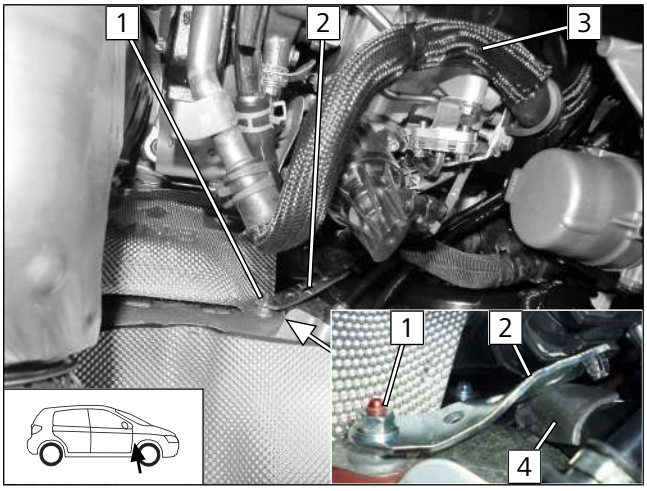


Fig. 114

Original vehicle hose 3 is tied back for demonstration purposes.

▶ Stick the section of self-adhesive foam strip near perforated bracket 2 on the underlying trim at position 4.

1 Original vehicle stud bolt with installed flanged nut, premounted perforated bracket 2, M6 flanged nut (8-10Nm)

11 Fuel

DANGER

Risk of fire and explosion due to leaking fuel and escaping fuel vapours.

The incorrect installation of the fuel extractor can cause damage and fire.

- ▶ Avoid electrostatic discharges and open fire
- ▶ When working on the fuel system, ensure sufficient ventilation and bleeding
- ▶ Open the fuel tank cap of the vehicle
- ▶ Ventilate the fuel tank
- ▶ Re-close the tank lock
- ▶ Catch any fuel running off with an appropriate container

Danger of damage to components

- ▶ Install fuel line and fuel pump wiring harness so that they are protected against stone impact
- ▶ Provide rub protection for fuel line and wiring harness in areas where there are sharp edges

11.1 Routing fuel line

Routing and fastening fuel line

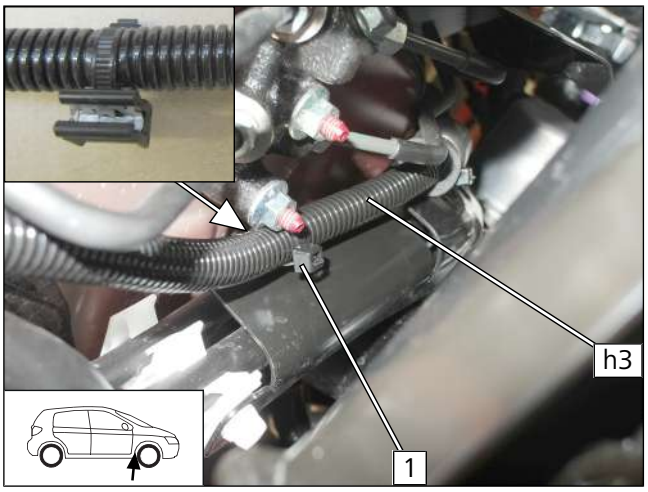


Fig. 115

- ▶ Route corrugated tube **h3** to the underbody as shown.

1 Edge clip cable tie

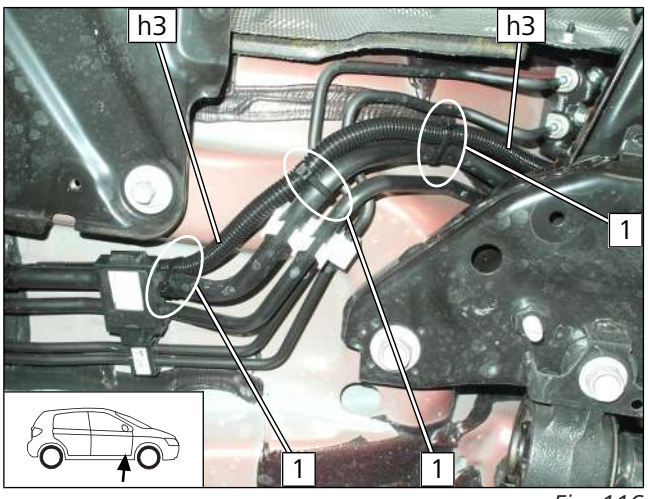


Fig. 116

- ▶ Route corrugated tube **h3** along original vehicle fuel lines.

1 Cable tie

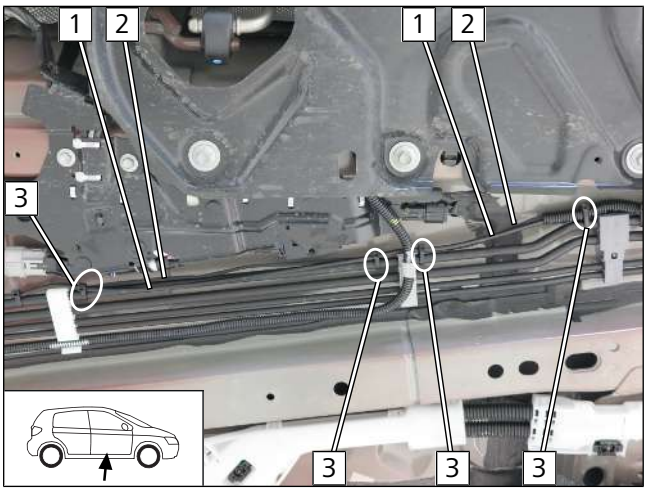


Fig. 117

▶ Route fuel line 1 and fuel pump wiring harness 2 along original vehicle fuel lines.

3 Cable tie

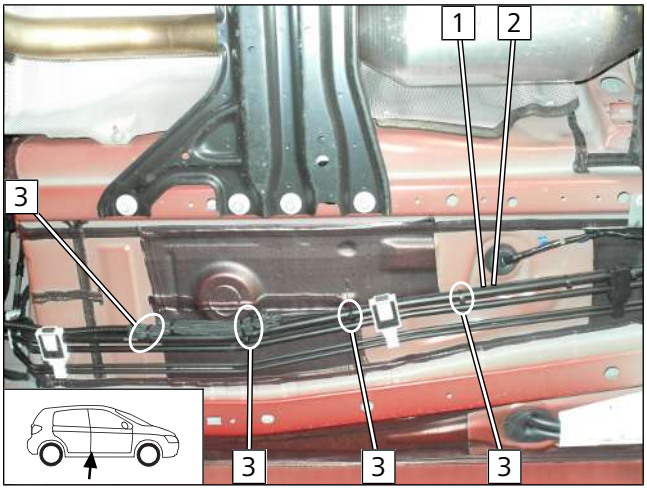


Fig. 118

▶ Route fuel line 1 and fuel pump wiring harness 2 along original vehicle fuel lines.

3 Cable tie

Premounting fuel pump

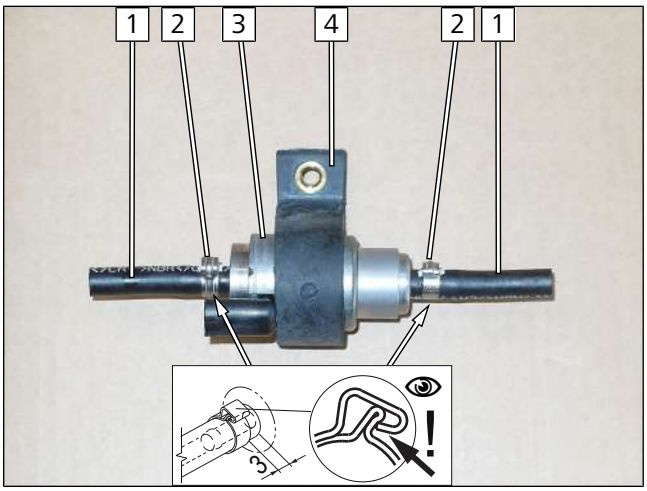


Fig. 119

1 Hose section
2 Ø10 clamp
3 Fuel pump
4 Fuel pump mount

Bending perforated bracket at an angle

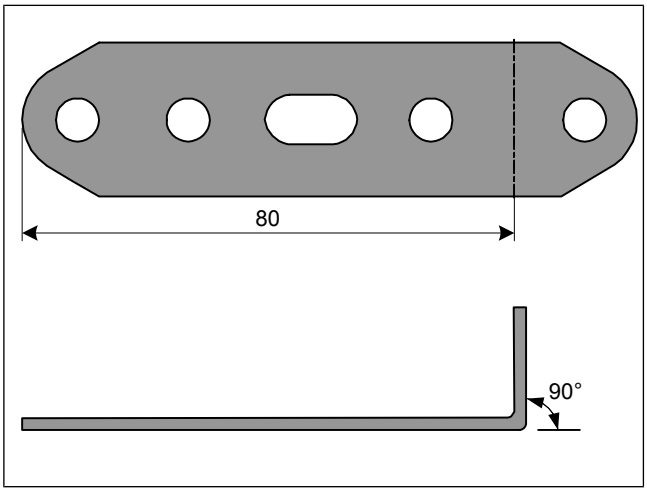


Fig. 120

Installing perforated bracket

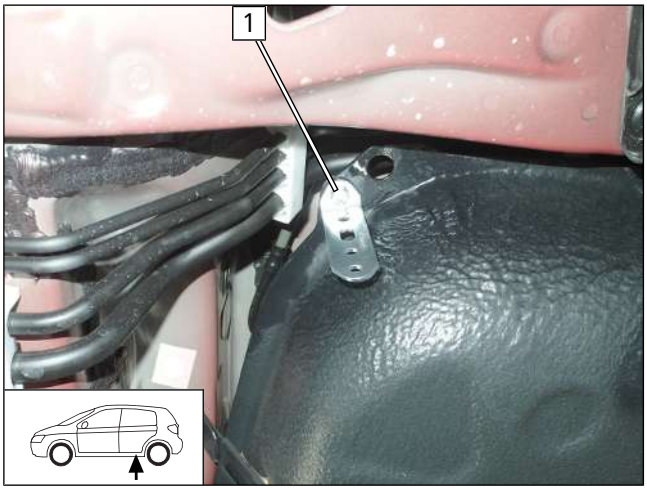


Fig. 121

1 M6x20 bolt, large diameter washer, perforated bracket, existing hole, flanged nut (8-10Nm)

Mounting fuel pump

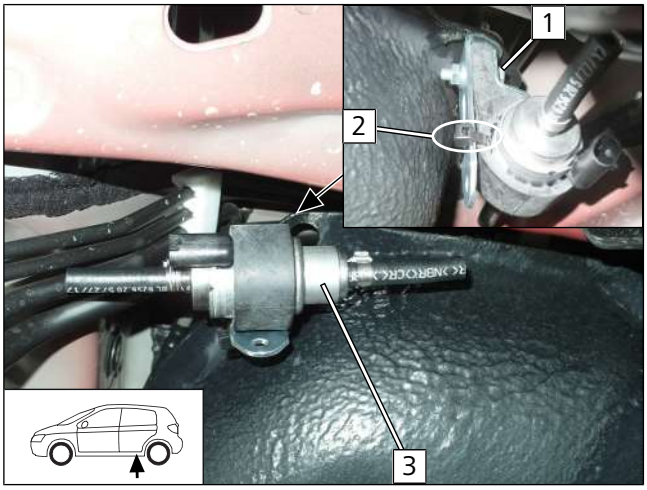


Fig. 122

1 M6x25 bolt, support angle bracket, fuel pump mount, premounted perforated bracket, flanged nut (8-10Nm)

2 Cable tie around perforated bracket and fuel pump mount

3 Fuel pump

Fuel pump connection

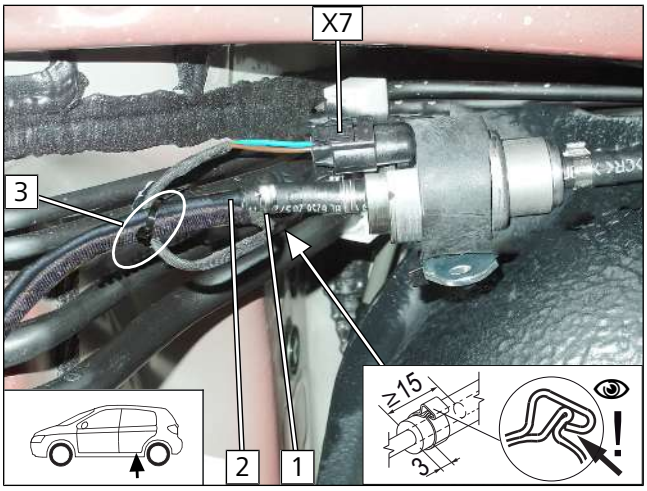


Fig. 123

▶ Cut heater fuel line to length. Complete connector **X7** as shown below.

1 Ø10 clamp
2 Heater fuel line
3 Cable tie

Assembling fuel pump connector X7

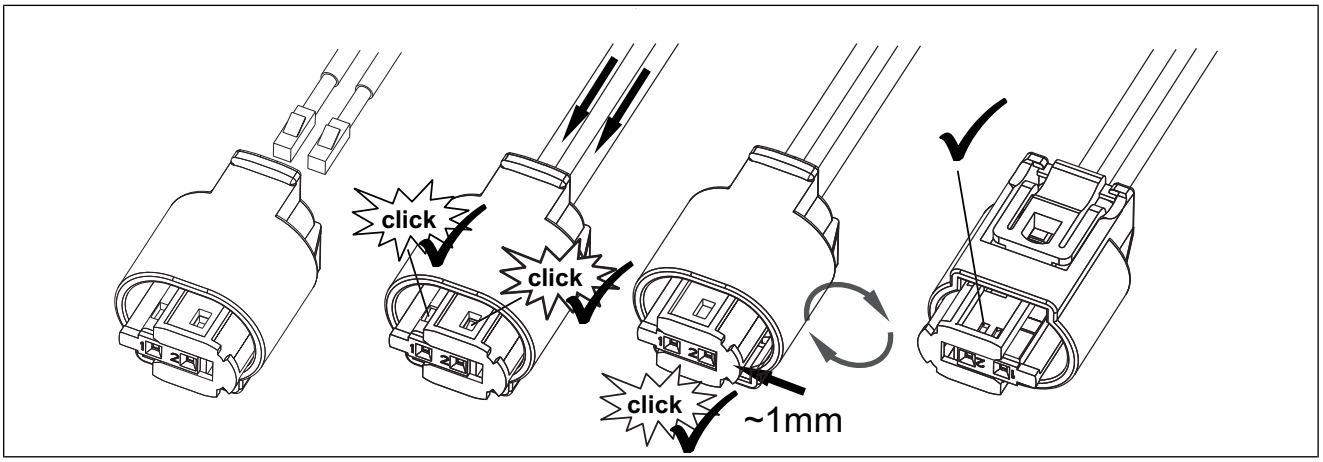


Fig. 124

Routing wiring harness

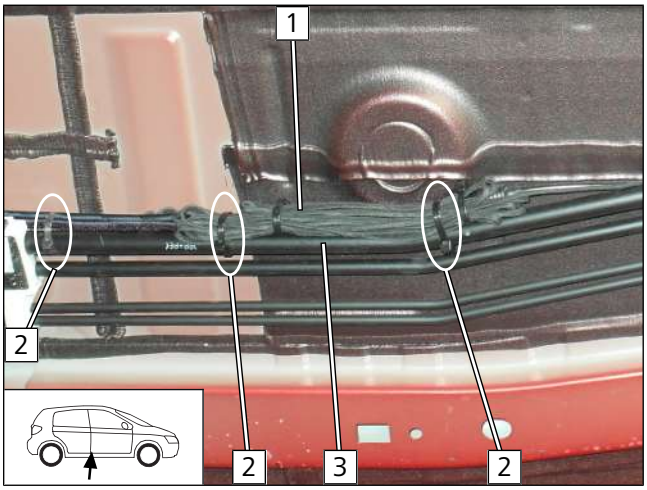


Fig. 125

▶ Attach excess wire length **1** to original vehicle fuel lines **3**.

2 Cable tie

11.2 Installing tank extracting device

Cutting fuel supply line

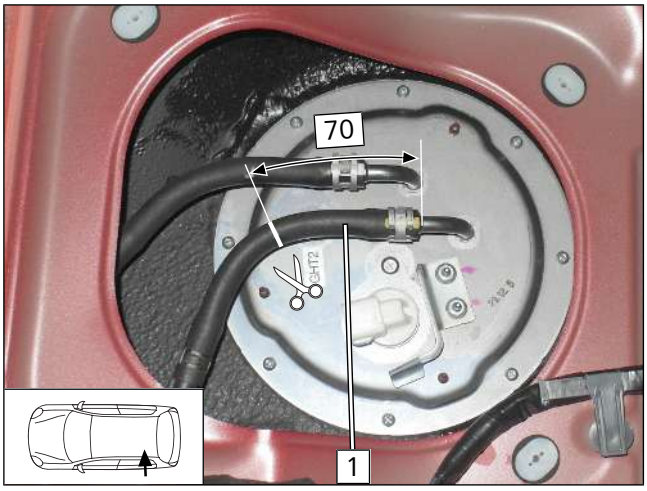


Fig. 126

DANGER

Risk of fire and explosion due to leaking fuel and escaping fuel vapours.

▶ Cut fuel supply line **1** as shown.

Connecting fuel line

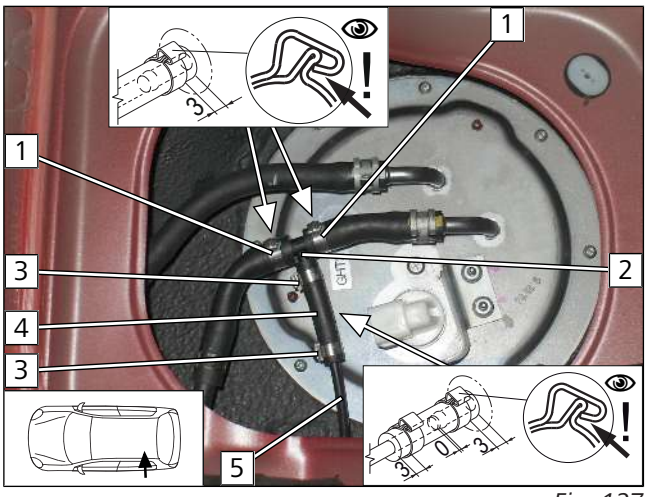


Fig. 127

1 13.5 clamp [2x]
2 8x5x8 tank extracting device (T-piece)
3 Ø10 clamp [2x]
4 Hose section
5 Fuel line of tank extracting device

11.3 Fuel pump connection

Connecting fuel line of tank extracting device

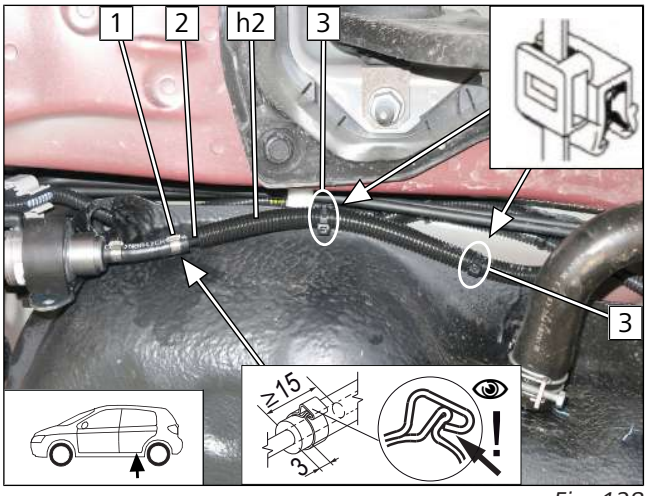


Fig. 128

Danger of damage to components

▶ Ensure sufficient distance from neighbouring components, correct if necessary.

▶ Draw FuelFix fuel line **2** into Ø10 corrugated tube **h2**.

1 Ø10 clamp
3 Edge clip cable tie

12 Exhaust

Preparing exhaust pipe

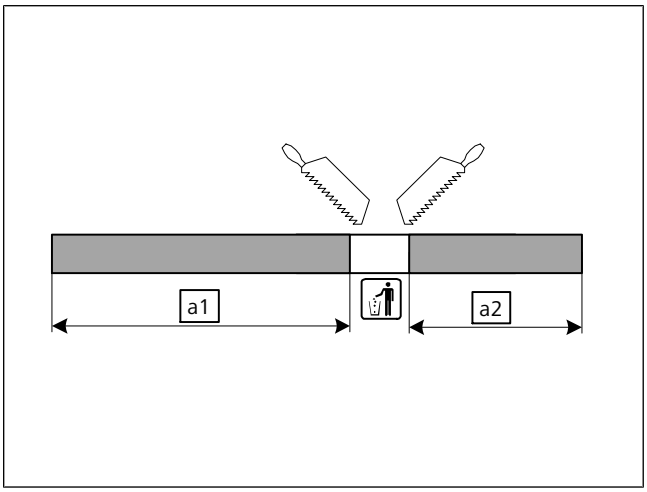


Fig. 129

a1 340
a2 210

Bending angle bracket

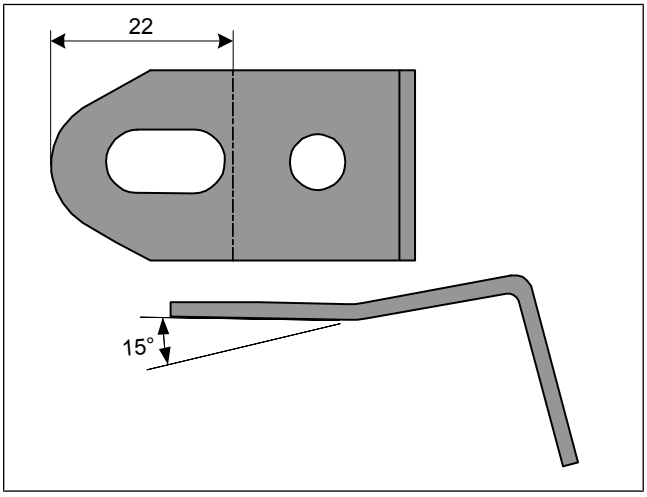


Fig. 130

Premounting exhaust silencer

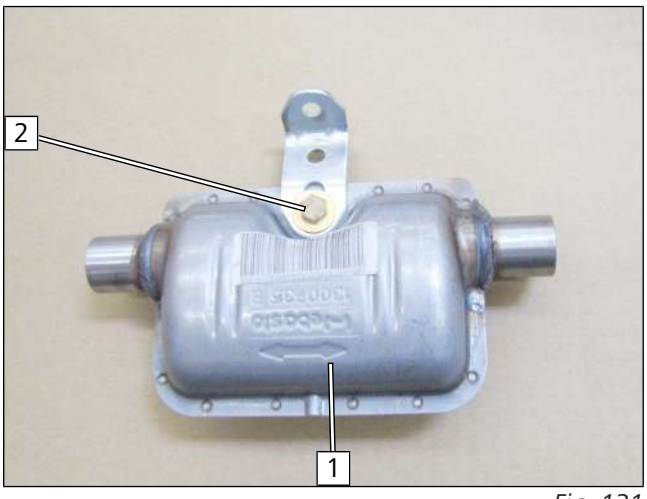


Fig. 131

1 Exhaust silencer
2 M6x16 bolt, large diameter washer, angle bracket, flanged nut (8-10Nm)

Bending perforated bracket

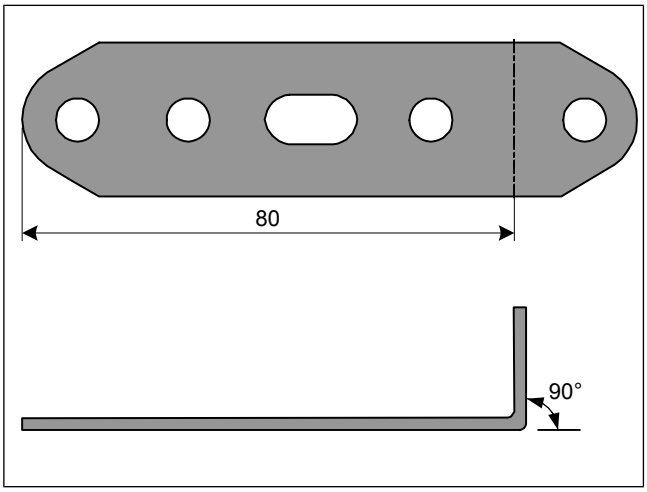


Fig. 132

Installing perforated bracket

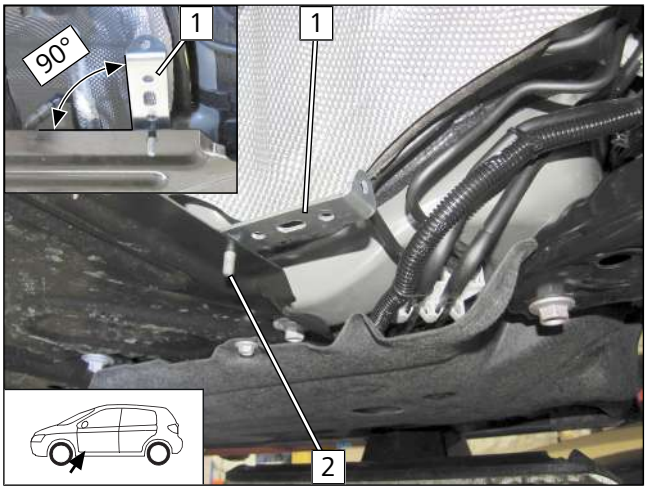


Fig. 133

▶ Mount M6x20 bolt with spring lockwasher **2** through the original vehicle thread from above (8-10Nm).

1 Perforated bracket

Installing spacer nut

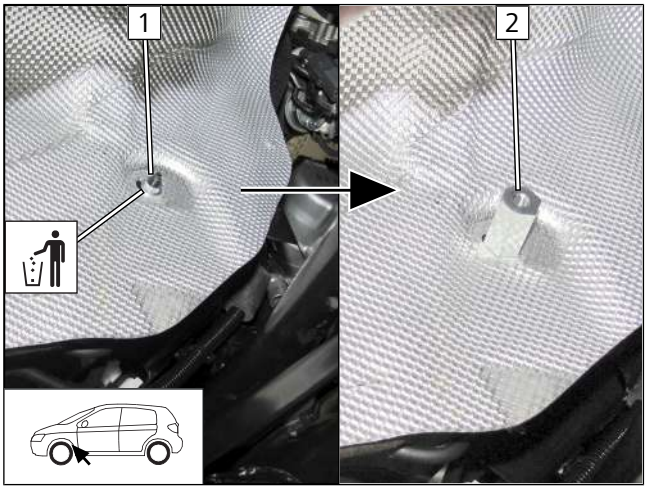


Fig. 134

▶ Remove original vehicle nut **1**.

2 Spacer nut 30, original vehicle stud bolt (8-10Nm)

Mounting exhaust silencer

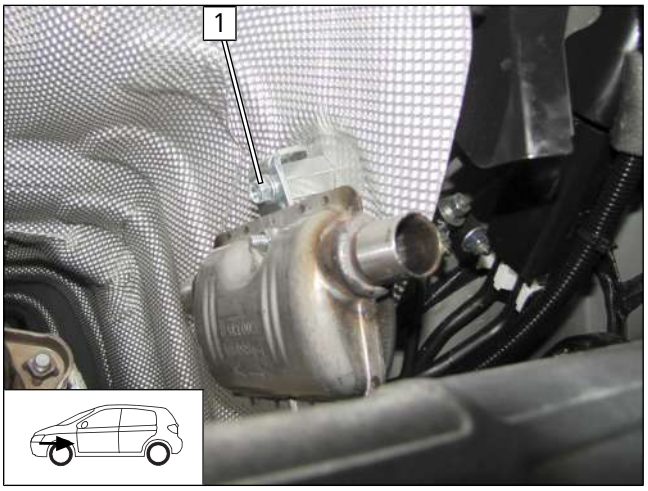


Fig. 135

1 M6x12 bolt, spring lockwasher, premounted spacer nut (8-10Nm)

Mounting exhaust pipe **a1** and spacer bracket

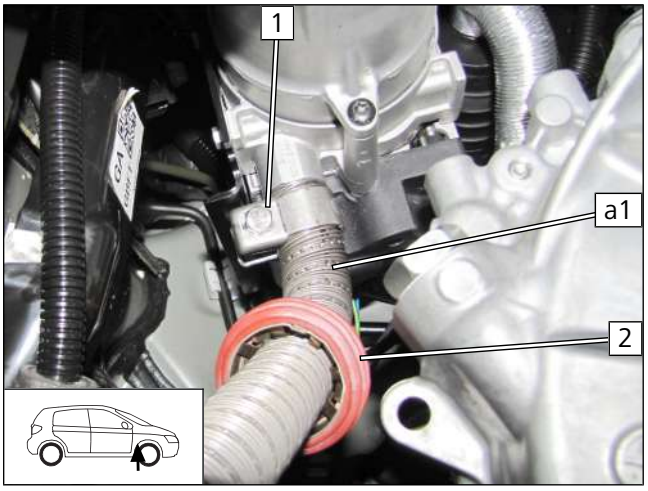


Fig. 136

1 Hose clamp

2 Spacer bracket

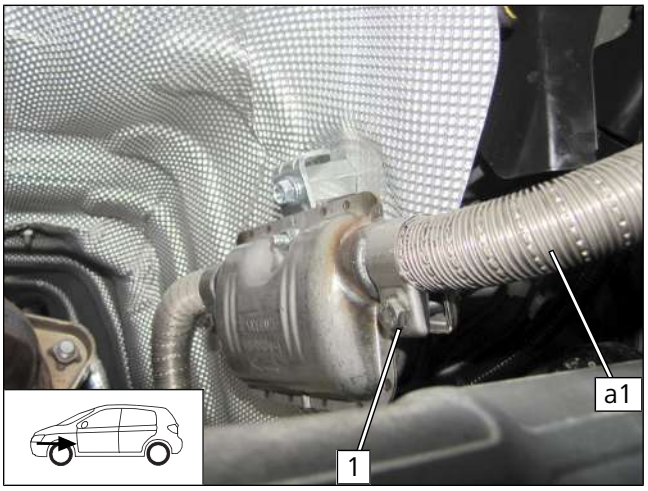


Fig. 137

1 Hose clamp

Aligning exhaust pipe **a1** and spacer bracket

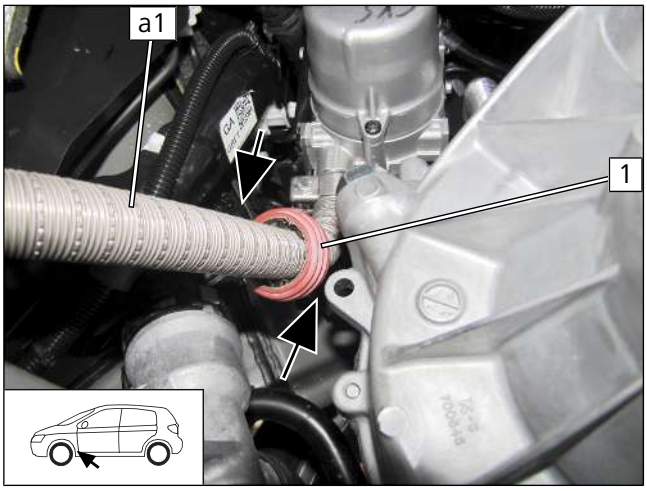


Fig. 138

Ensure sufficient distance from neighbouring components, correct if necessary.

>15

▶ Align spacer bracket **1** between the transmission and steering unit as shown.

Mounting exhaust pipe **a2**

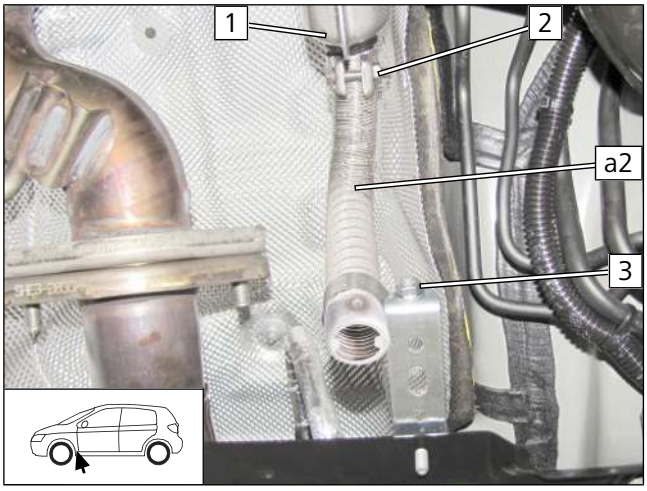


Fig. 139

1 Exhaust silencer

2 Hose clamp

3 M6x16 bolt, Ø25 pipe clamp, premounted perforated bracket, flanged nut (8-10Nm)

12.1 Final work for exhaust system

Aligning exhaust silencer

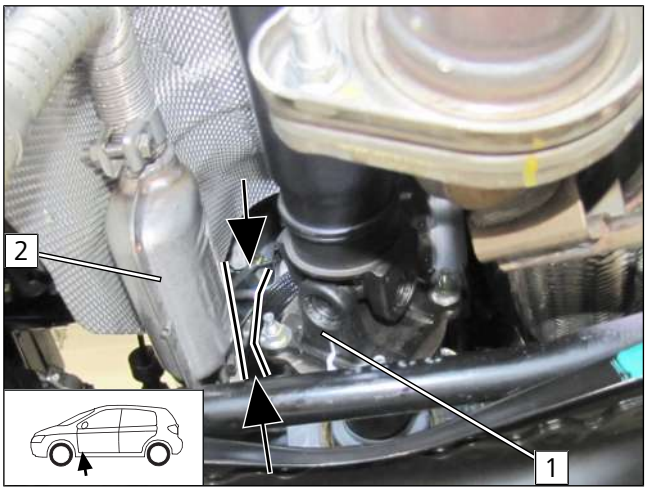


Fig. 140

Ensure sufficient distance between cardan shaft flange (only for 4WD) **1** and exhaust silencer **2**, correct if necessary.

Aligning exhaust pipe **a2**

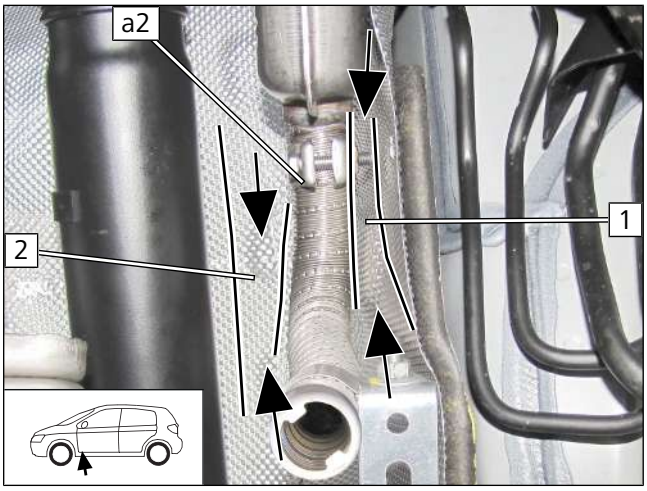
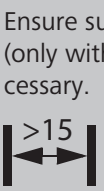


Fig. 141

Ensure sufficient distance from the heat conduction plate at position 1 and correct if necessary.

Ensure sufficient distance from the cardan shaft (only with 4WD) at position 2 and correct if necessary.



12.1.1 Mounting heat guard plate (2WD)

Adapting heat guard plate

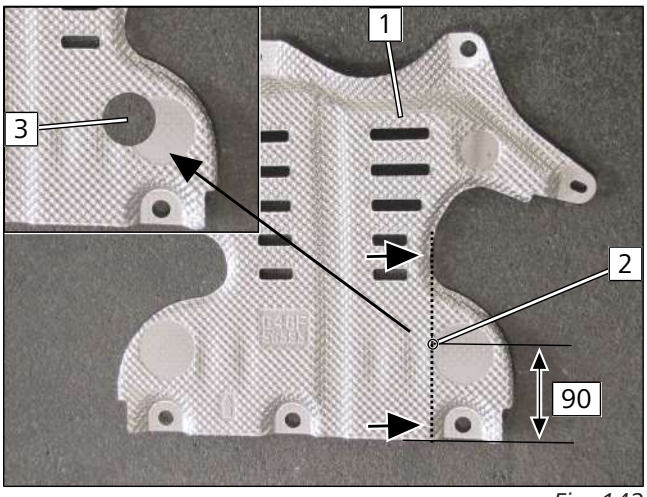


Fig. 142

1 Heat guard plate
2 Copy hole pattern
3 Ø40 hole

Mounting heat guard plate

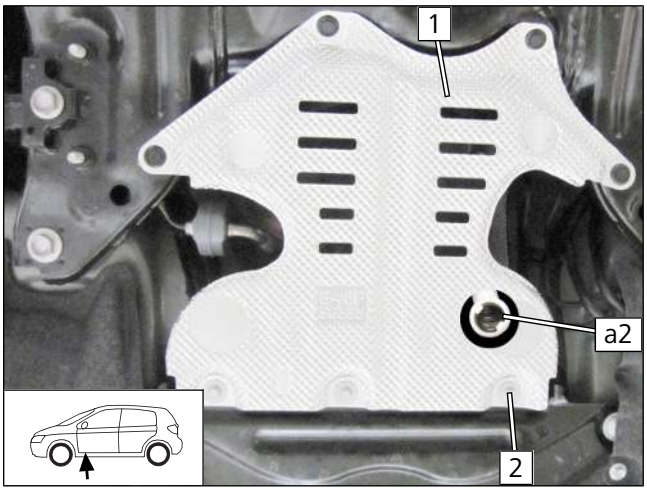


Fig. 143

▶ Mount heat guard plate **1**. Align end section of exhaust pipe **a2** with centre of drilled hole.

2 Premounted M6x20 bolt, large diameter washer, flanged nut (8-10Nm)

12.1.2 Mounting heat guard plate (4WD)

Adapting heat guard plate

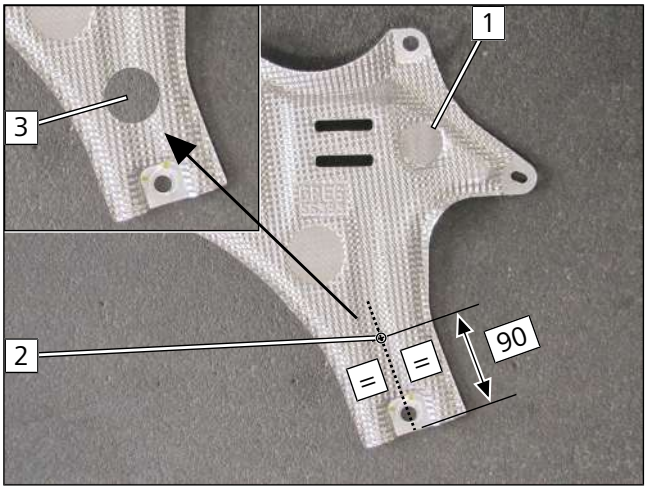


Fig. 144

1 Heat guard plate
2 Copy hole pattern
3 Ø40 hole

Mounting heat guard plate

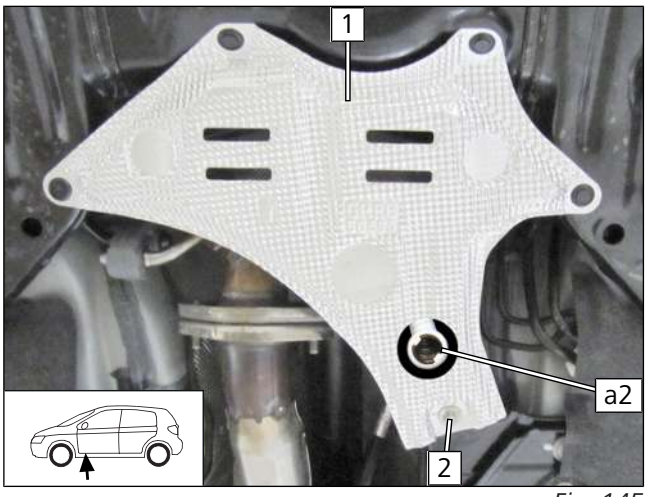


Fig. 145

▶ Mount heat guard plate 1.. Align end section of exhaust pipe a2 with centre of drilled hole.

2 Premounted M6x20 bolt, large diameter washer, flanged nut (8-10Nm)

13 Electrical system of passenger compartment

13.1 Electrical system preparation

Preparing / assigning wires

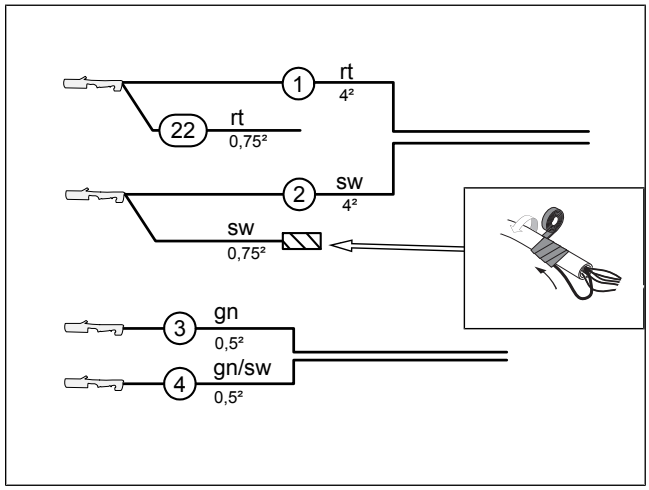


Fig. 146

Wire sections retain their numbering in the entire document.

① Red (rt) wire of fan wiring harness
② Black (sw) wire of fan wiring harness
③ Green (gn) wire from wiring harness of PWM control
④ Green/black (gn/sw) wire from wiring harness of PWM control

View of male connectors and female connectors

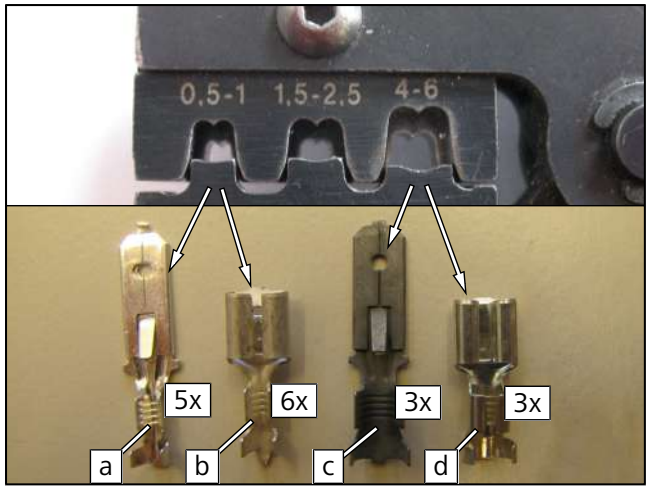


Fig. 147

a Male connector 6.3 for 0.5 - 1mm² wire cross-section
b Female connector 6.3 for 0.5 - 1mm² wire cross-section
c Male connector 6.3 for 4 - 6mm² wire cross-section
d Female connector 6.3 for 4 - 6mm² wire cross-section

Instructions for connecting the contacts

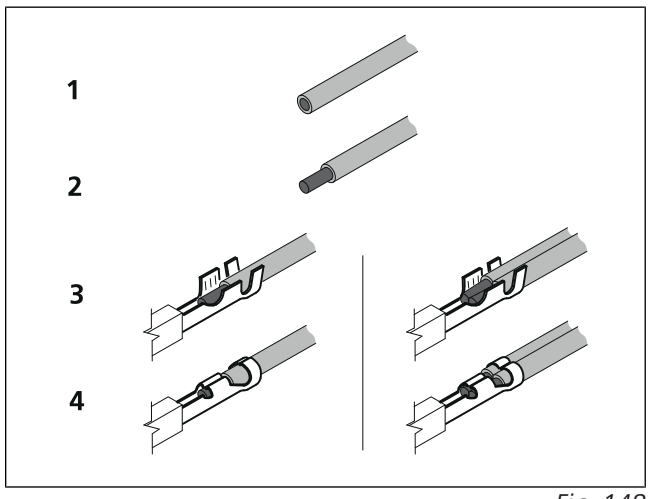


Fig. 148

Preparing fan wiring harness

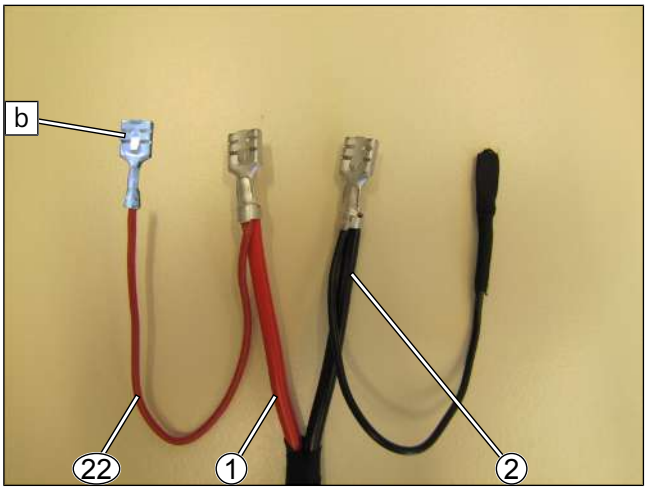


Fig. 149

▶ Install female connector **b**.

① 4mm² red (rt) wire from fan wiring harness for K1/87a

② 4mm² black (sw) wire from fan wiring harness for K1/30

22 0.75mm² red (rt) wire from fan wiring harness for PWM GW/KL15

Preparing passenger compartment relay and fuse holder (RSH)

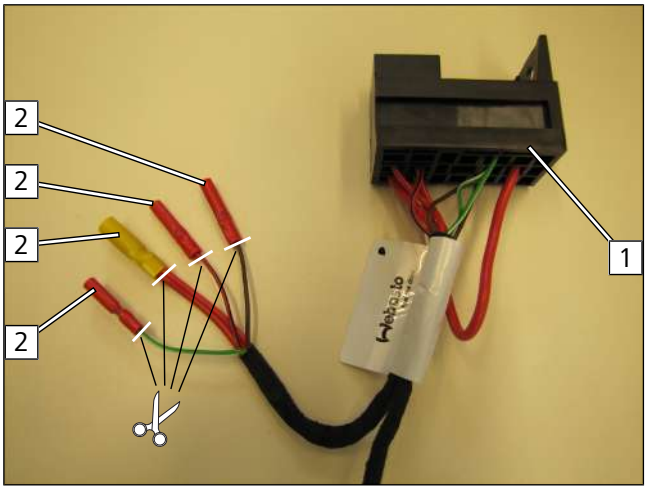


Fig. 150

▶ Cut off butt connector **2** [4x] from wires in accordance with the markings.

1 RSH

Installing male connector

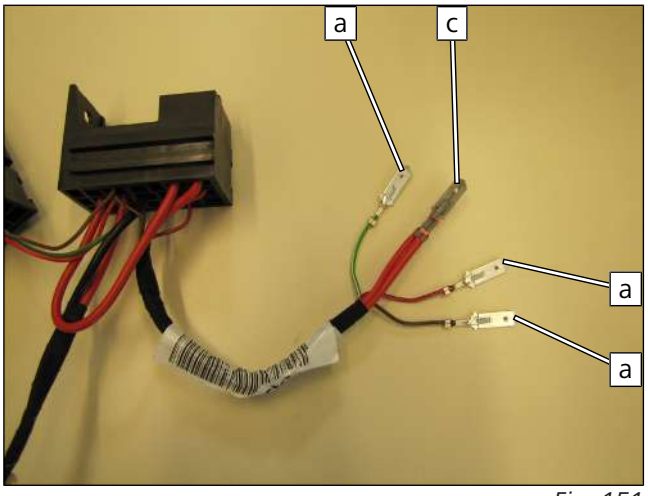


Fig. 151

Install as shown in the next figure

▶ Male connector **a** on:

⇨ Red/black (rt/sw) wire (0.5mm²)

⇨ Green/white (gn/ws) wire (0.5mm²)

⇨ Brown (br) wire (0.5mm²)

▶ Male connector **c** on:

⇨ Red (rt) wire (4.0mm²) together with red (rt) wire (1.5mm²)

Installing connector housing

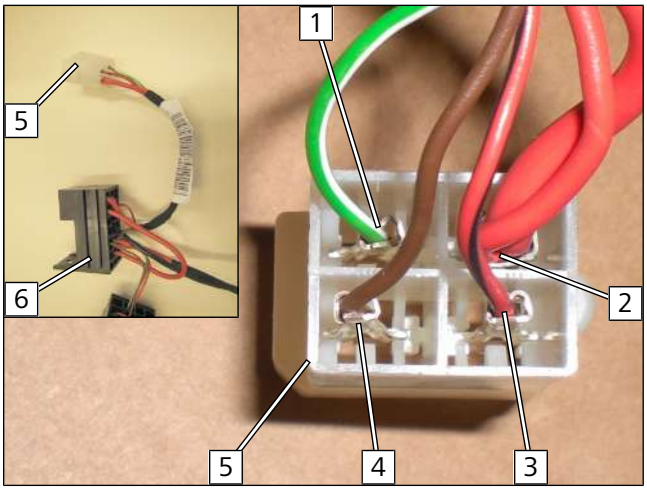
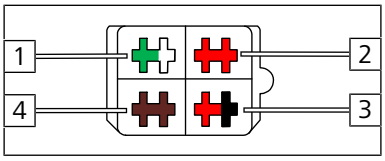


Fig. 152

1 Green/white (gn/ws) wire (0.5mm²)
2 Red (rt) wire (4.0mm²) and red (rt) wire (1.5mm²)
3 Red/black (rt/sw) wire (0.5mm²)
4 Brown (br) wire (0.5mm²)
5 4-pin male connector housing
6 RSH

Wire-side view:



13.2 Preparing the PWM GW (Pulse Width Modulator Gateway)

Fig. 153

The PWM GW is preprogrammed for approx. fan level 3. However, the vehicle fan speed can deviate for technical reasons. In case the fan power is too high / too low, the PWM GW can be reprogrammed using the Webasto diagnosis. See section 'Final Work'.

Checking settings

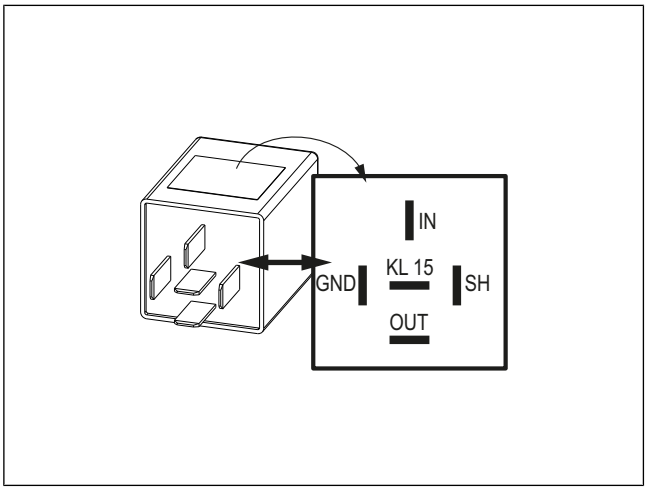


Fig. 154

▶ Check the settings and adjust if necessary under the 'Final Work' section.

Parameters	Setting
Duty cycle	65%
Frequency	500Hz
Voltage	not relevant
Function	Low side

Connecting wires to PWM GW socket

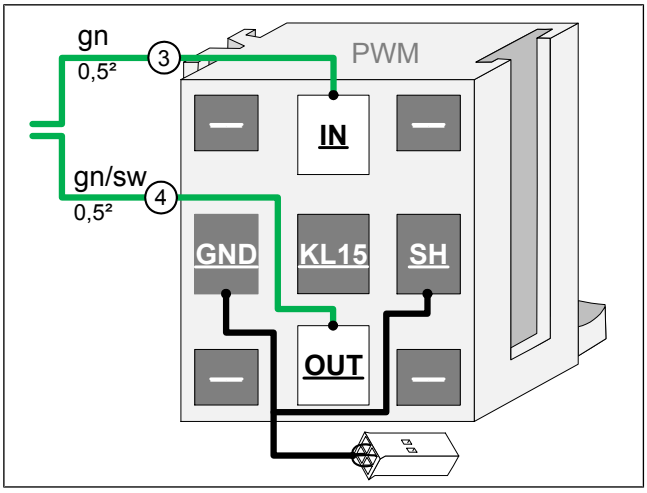


Fig. 155

③ Green (gn) wire from wiring harness of PWM control

④ Green/black (gn/sw) wire from wiring harness of PWM control

13.3 Preparing RSH and PWM GW

Assembling RSH and PWM GW sockets, connecting wire and connecting socket with connector

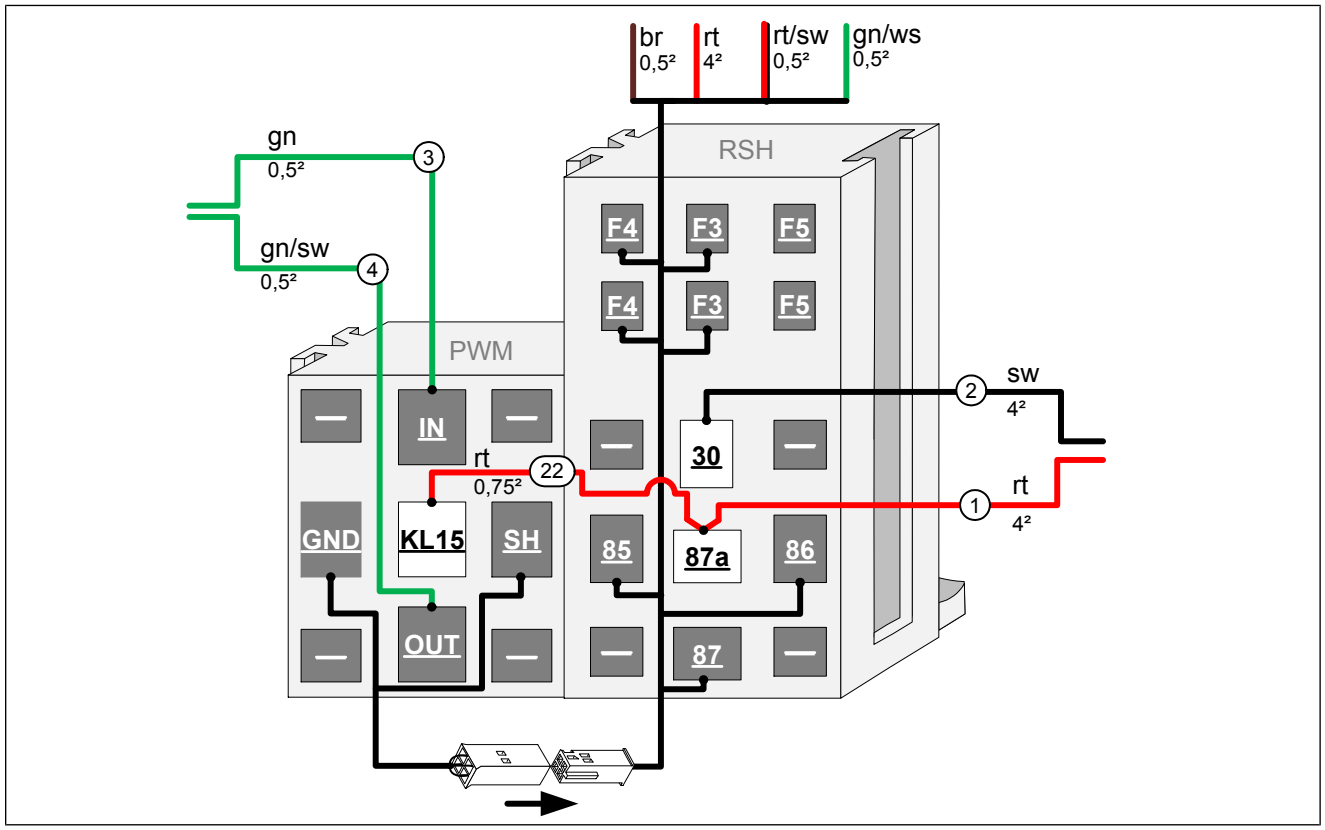


Fig. 156

Premounting RSH and PWM GW socket

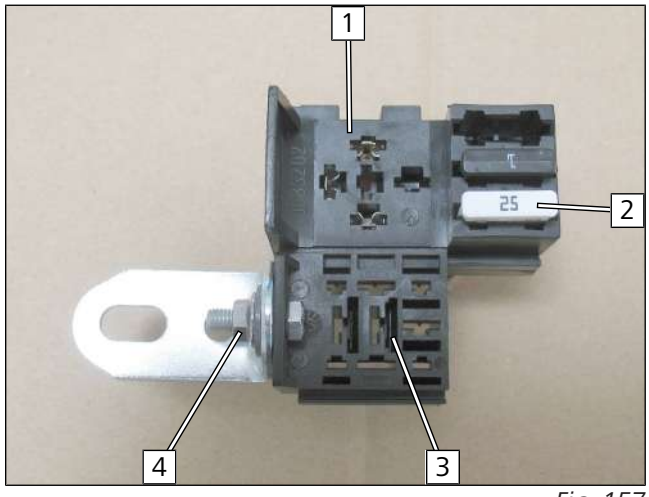


Fig. 157

1 RSH
2 25A fuse F4
3 PWM GW socket
4 M5x16 bolt, large diameter washer, nut (5-6Nm)

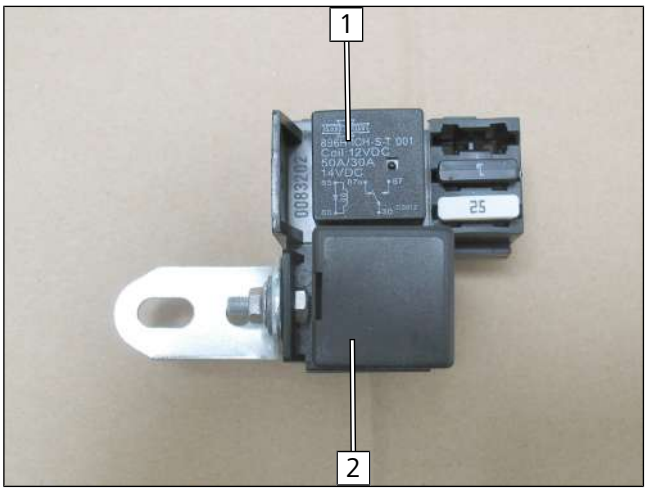


Fig. 158

[1] Relay K1
[2] PWM GW

13.4 Routing and premounting the wiring harnesses in the passenger compartment

Mounting contacts

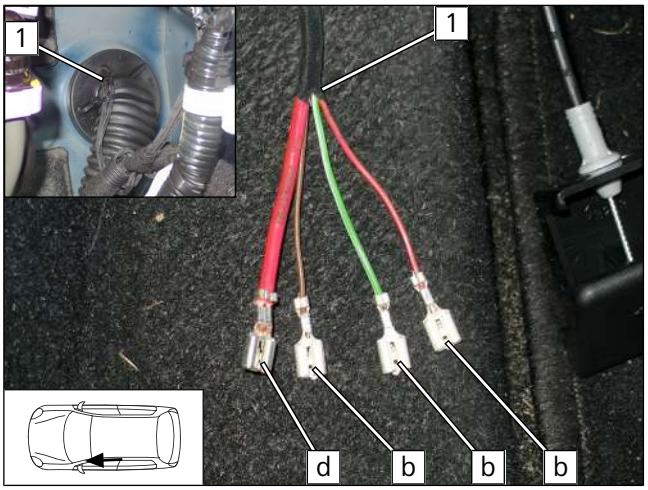


Fig. 159

Install as shown in the next figure

- Female connector [b] to:
  - ⇨ Red/black (rt/sw) wire (0.5mm²)
  - ⇨ Green/white (gn/ws) wire (0.75mm²)
  - ⇨ Brown (br) wire (0.5mm²)
- Female connector [d] to:
  - ⇨ Red (rt) wire (4.0mm²)

[1] Fan controller wiring harness coming out of the engine compartment

Mounting female connector housing to fan controller wiring harness

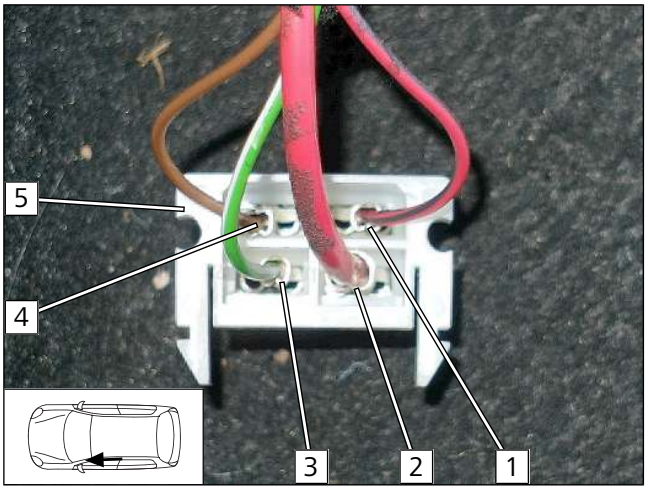
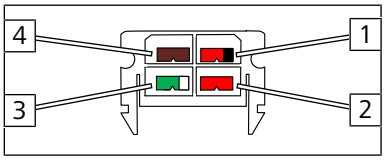


Fig. 160

[1] Red/black (rt/sw) wire (0.5mm²)
[2] Red (rt) wire (4.0mm²)
[3] Green/white (gn/ws) wire (0.75mm²)
[4] Brown (br) wire (0.5mm²)
[5] 4-pin female connector housing

Wire-side view:



Mounting RSH

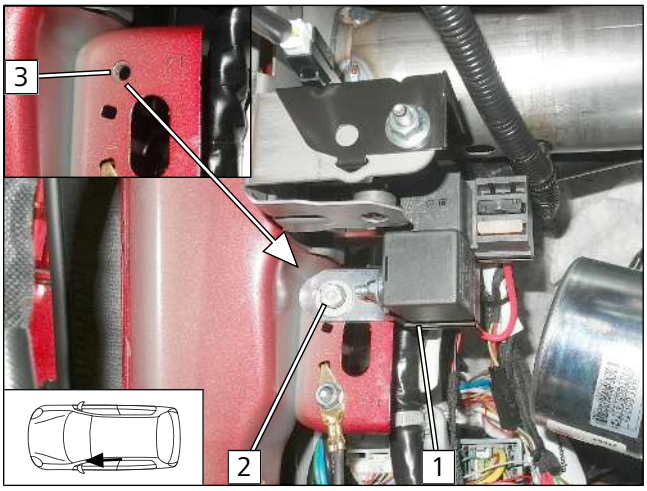


Fig. 161

[1] RSH, premounted

[2] M6x20 bolt, large diameter washer, premounted angle bracket (8-10Nm), existing thread [3]

Connecting and fastening wiring harnesses

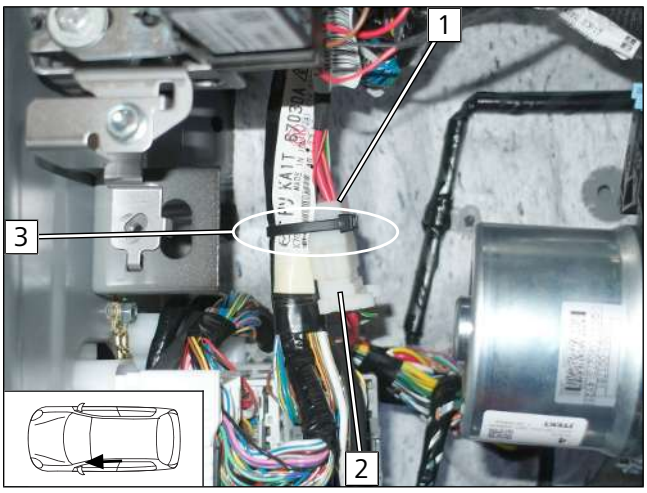


Fig. 162

[1] Male connector housing of RSH wiring harness

[2] Fan controller wiring harness female connector housing

[3] Cable tie

Routing wiring harnesses

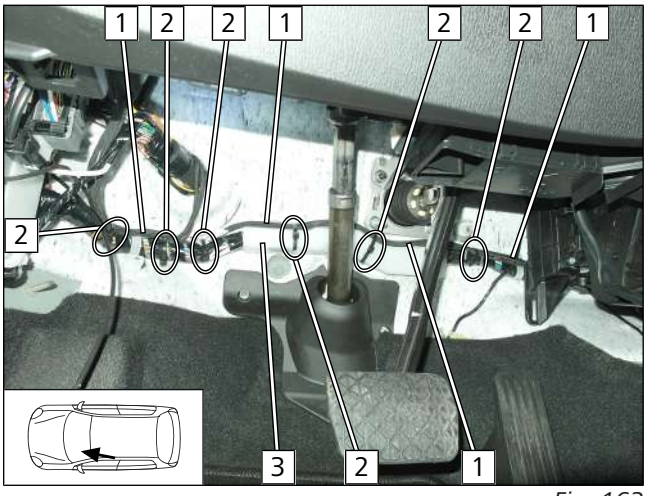


Fig. 163

▶ Route fan wiring harness and PWM control wiring harness [1] along line duct [3] to the front passenger's side.

[2] Cable tie

Installing male connectors and female connectors

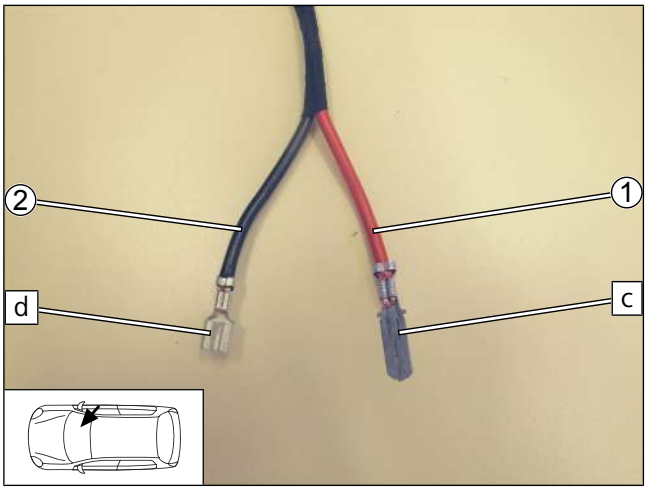


Fig. 164

- ▶ Male connector **c** to:
  - ⇨ Red (rt) wire (4mm²)
- ▶ Female connector **d** to:
  - ⇨ Black (sw) wire (4.0mm²)

① Red (rt) wire of fan wiring harness of K1/87a

② Black (sw) wire of fan wiring harness of K1/30

Installing male connectors and female connectors

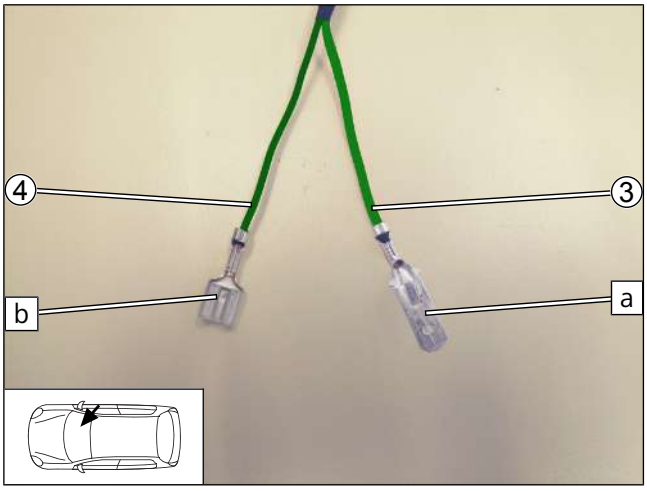


Fig. 165

- ▶ Male connector **a** to:
  - ⇨ Green (gn) wire (0.5mm²)
- ▶ Female connector **b** to:
  - ⇨ Green/black (gn/sw) wire (0.5mm²)

③ Green (gn) wire of PWM control wiring harness from PWM GW/ IN

④ Green/black (gn/sw) wire of PWM control wiring harness from PWM GW/OUT

Premounting connector housing

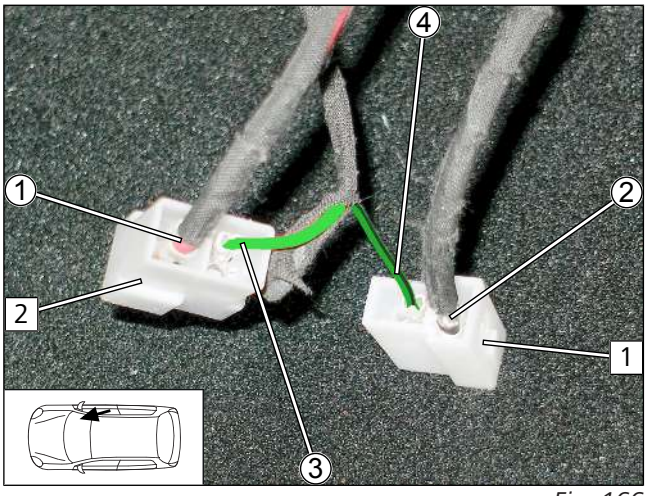


Fig. 166

1 2-pin female connector housing

2 2-pin male connector housing

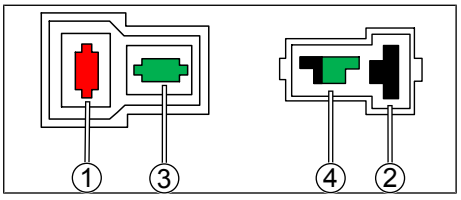
① Red (rt) (4.0mm²) wire of fan wiring harness of K1/87a

② Black (sw) (4.0mm²) wire of fan wiring harness of K1/30

③ Green (gn) (0.5mm²) wire of PWM control wiring harness from PWM GW/ IN

④ Green/black (gn/sw) (0.5mm²) wire of PWM control wiring harness from PWM GW/OUT

Wire-side view:



13.5 Wiring diagram

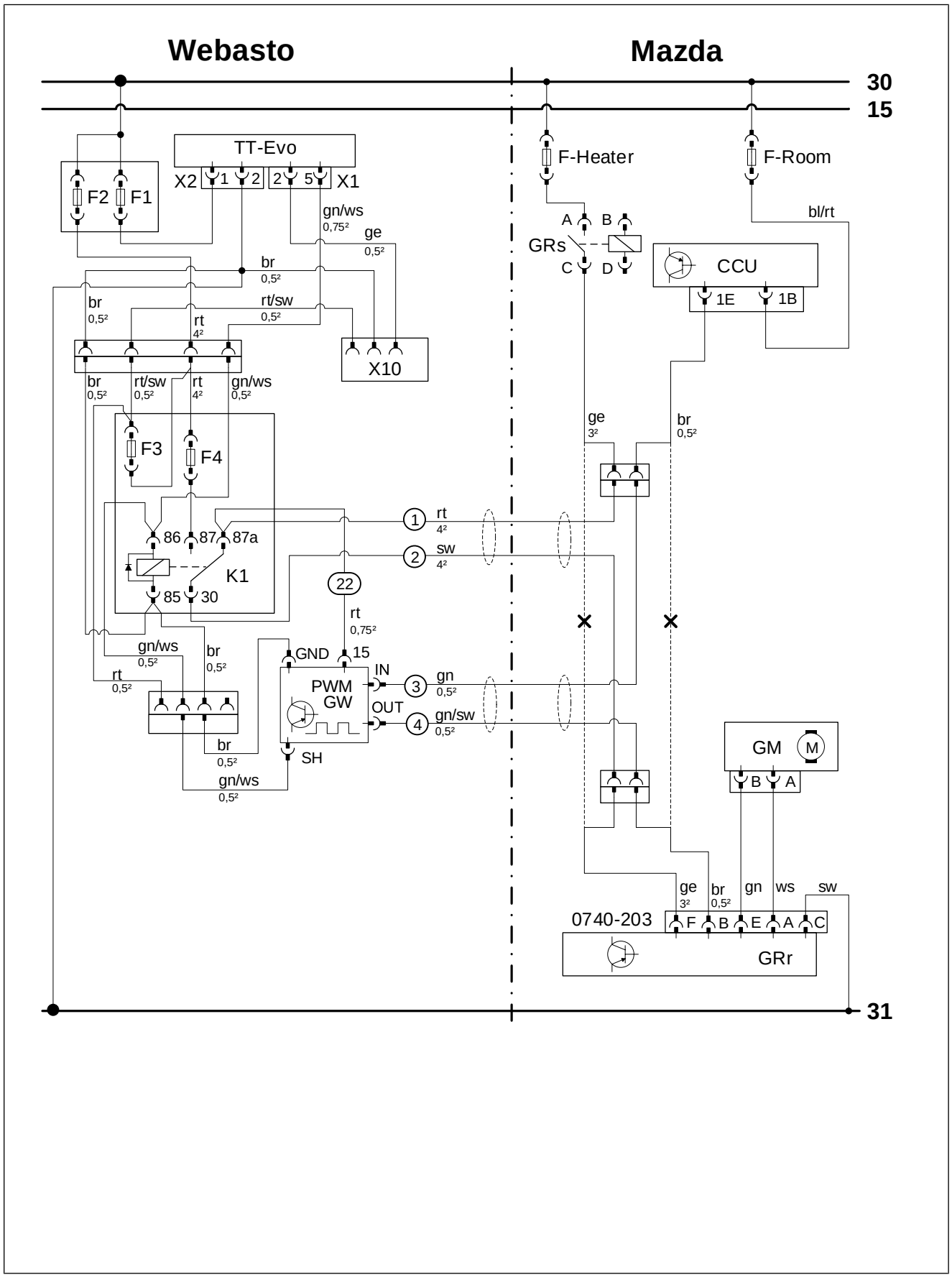


Fig. 167

Legend to wiring diagram

The vehicle connector and component designations are freely chosen by Webasto.
Cable colours may vary.

Vehicle components		Symbols	
Abbreviation	Component	Abbreviation	Designation
F-Heater	Fuse 40A	X	Cutting point
F- Room	Fuse 15A		
GRs	Fan relay		
CCU	Air-conditioning control unit		
GM	Fan motor		
GRr	Fan controller		
0740-203	6-pin connector of GRr AAC (2 zones)	Wiring colours may vary	

Webasto components		Cable colours	
Abbreviation	Component	Abbreviation	Colour
A	Male plug for CLR module wiring harness	bg	beige
B	Female plug for CLR module wiring harness	bl	blue
C	Male plug for adapter wiring harness	br	brown
D	Female plug for adapter wiring harness	dbl	dark blue
E	Male plug for Plug&Play wiring harness	dgn	dark green
F	Female plug for Plug&Play wiring harness	ge	yellow
CCL GW	CAN CAN LIN Gateway	gn	green
CL GW	CAN LIN Gateway	gr	grey
CLR	Cold start module	hbl	light blue
D1	Diode	hgn	light green
D2	Diode group	la	salmon
F0	Additional fuse for power supply	or	orange
F1	Heater main fuse	pk	pink
F2	Passenger compartment fan controller main fuse	rt	red
F3	Control element fuse	sw	black
F4	Fan controller fuse	vi	violet
F5	Additional fuse	ws	white
HG	Heater TT-Evo		
K1	Relay K1		
K2	Relay K2		
K3	Relay K3		
LIN GW	LIN Gateway		
PWM GW	Pulse width modulator gateway		
RSH	Relay and fuse holder of passenger compartment		
RTD	Temperature sensor		
X10	Female plug for control element		
Y	Power adapter		

13.6 Fan controller

Removing fan controller connector

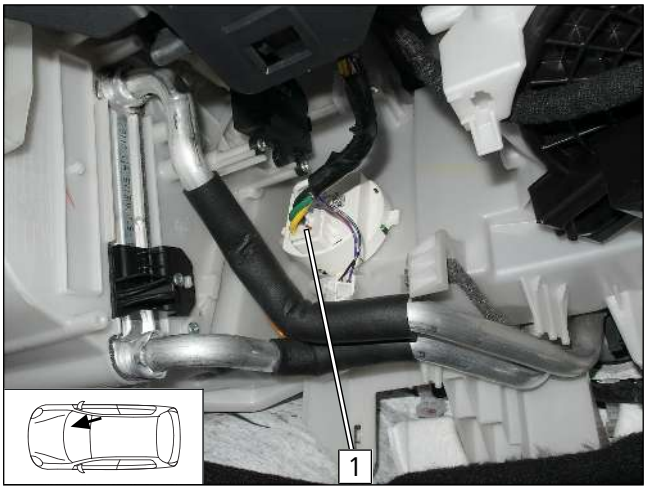
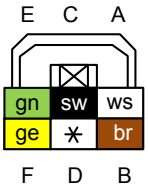


Fig. 168

The air duct is removed for a better view.

1 6-pin fan controller connector 0740-203



Locating, exposing and preparing wires

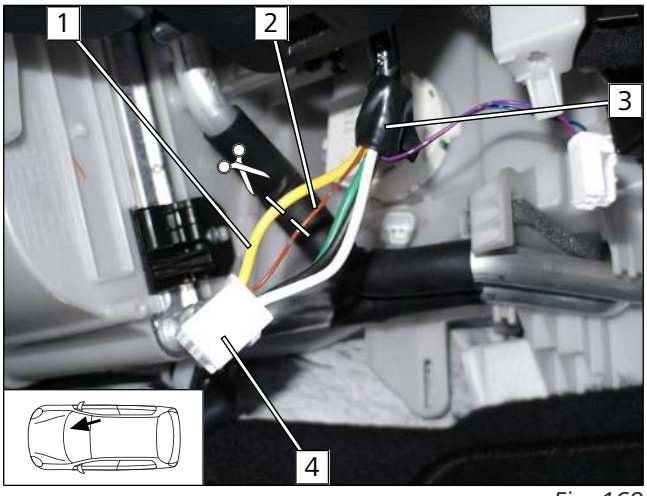


Fig. 169

Produce all following electrical connections as shown in the system wiring diagram.

▶ Remove insulation 3 around original vehicle wiring harness as shown. Disconnect wires as shown.

1 Yellow (ge) wire to fan controller/ pin F
2 Brown (br) wire to fan controller/ pin B
4 6-pin fan controller connector 0740-203

View of wires

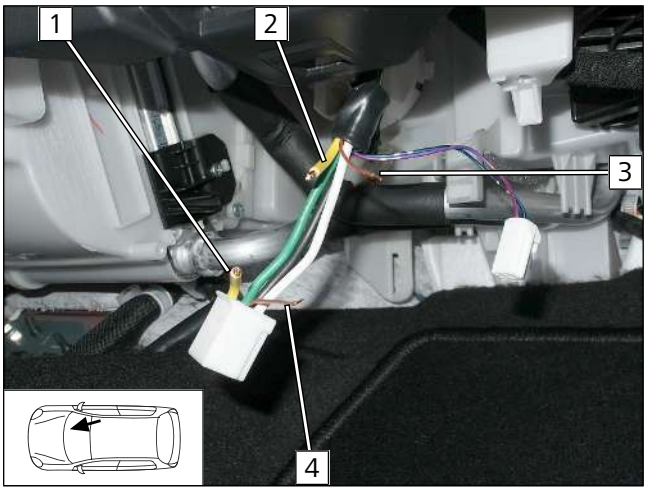


Fig. 170

1 Yellow (ge) wire to fan controller/ pin F
2 Yellow (ge) wire from fan relay/ pin C
3 Brown (br) wire from A/C control unit
4 Brown (br) wire to fan controller/ pin B

Installing male connectors and female connectors

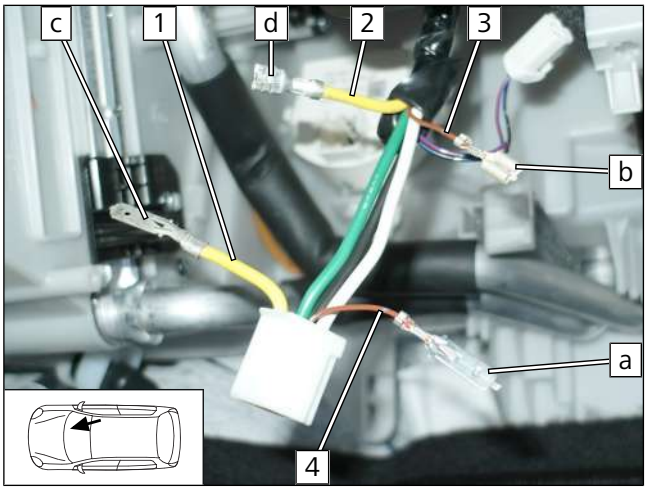


Fig. 171

1. Male connector **c** on yellow (ge) wire to fan controller/ pin F
2. Female connector **d** on yellow (ge) wire from fan relay/ pin C
3. Female connector **b** on Brown (br) wire of A/C control unit/ pin 1E
4. Male connector **a** on brown (br) wire to fan controller/ pin B

Installing connector housing

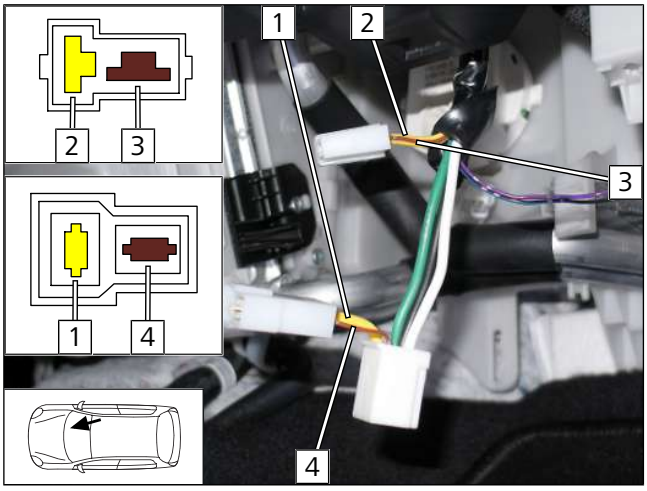


Fig. 172

1. Yellow (ge) wire to fan controller/ pin F
2. Yellow (ge) wire of fan relay/ pin C
3. Brown (br) wire of A/C control unit/ pin 1E
4. Brown (br) wire to fan controller/ pin B

Installing fan controller connector

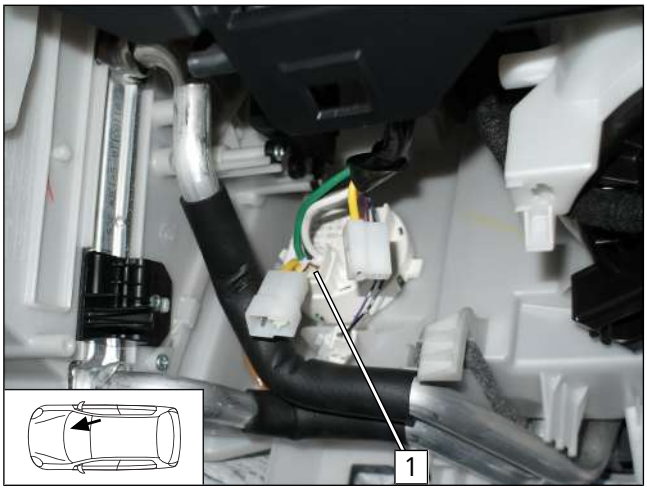


Fig. 173

1. 6-pin fan controller connector 0740-203

Connecting wiring harnesses

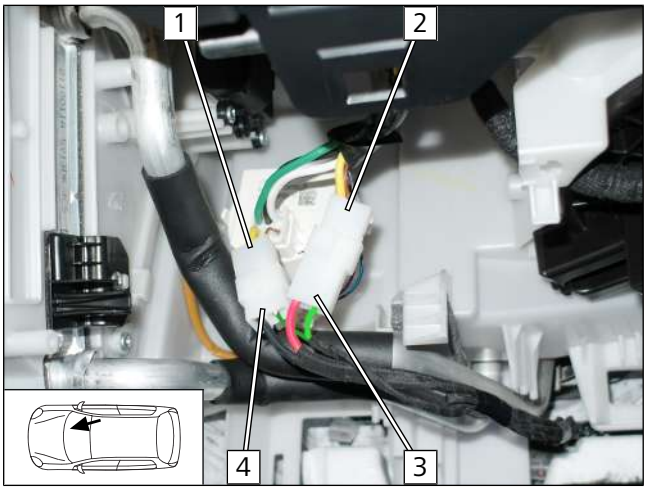


Fig. 174

1 Yellow and brown (ge and br) wire / fan controller

2 Yellow and brown (ge and br) wire / fan relay and A/C control unit

3 Red (rt) wire / K1/87a and green (gn) wire / PWM GW/ IN

4 Black (sw) wire / K1/30 and green/black (gn/sw) wire / PWM GW/ OUT

Routing wiring harnesses

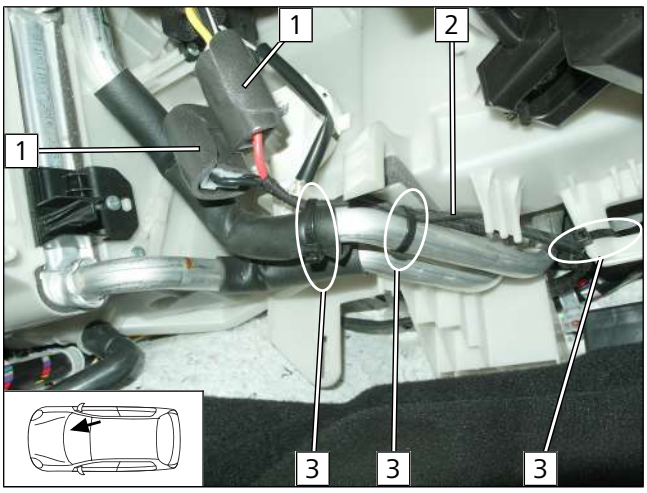


Fig. 175

▶ Wrap connector with self-adhesive foam 1.

2 Fan wiring harness and PWM control wiring harness

3 Cable tie

14 Electrical system of control elements

14.1 Telestart option

Preparing bracket

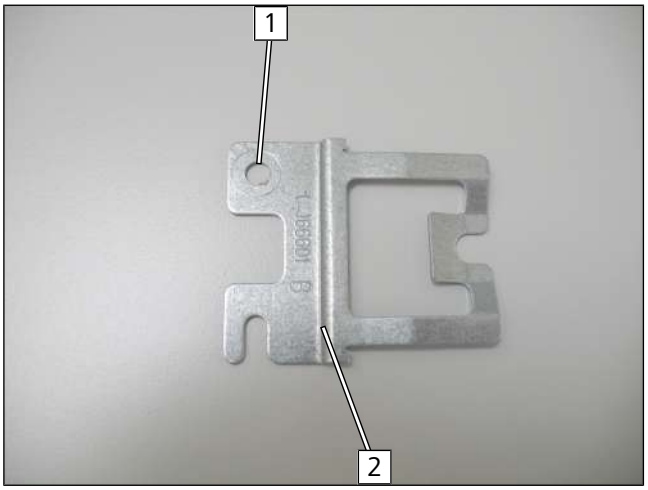


Fig. 176

▶ Drill out hole 1 of Telestart bracket 2 to Ø6.5

Mounting receiver

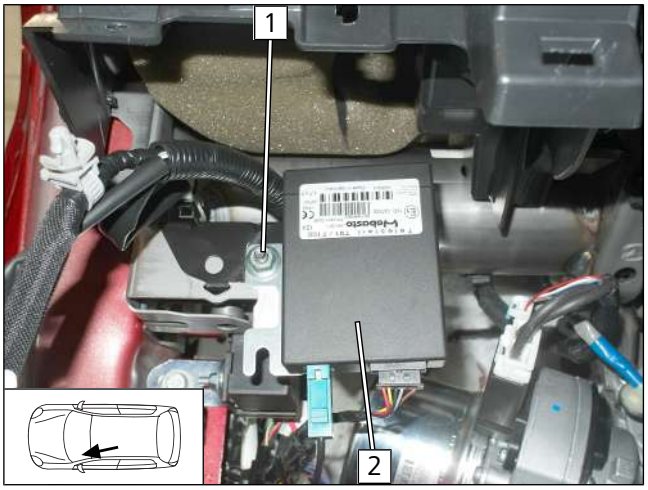


Fig. 177

Observe the Telestart installation documentation.

1 Original vehicle stud bolt, receiver bracket, flanged nut

2 Telestart receiver

Mounting temperature sensor, only in case of T100 HTM

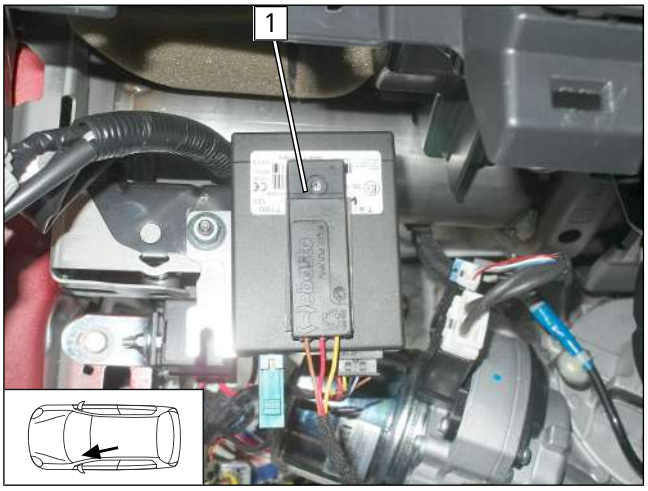


Fig. 178

▶ Fasten temperature sensor 1 using double-sided adhesive tape.

Preparing foam strip

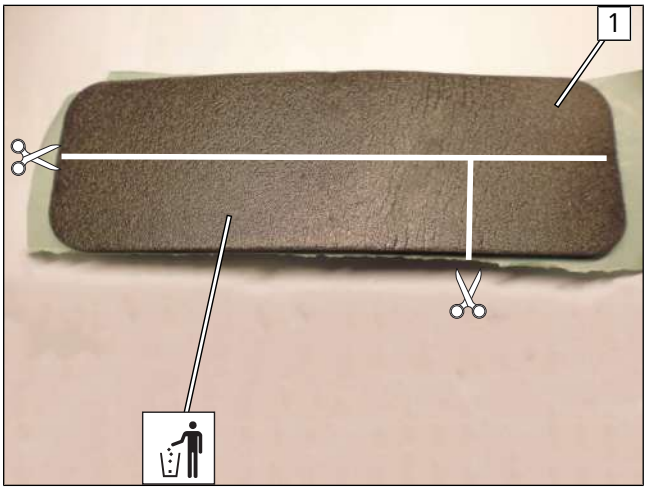


Fig. 179

▶ Cut self-adhesive foam strip 1 into three sections as shown.

Mounting aerial

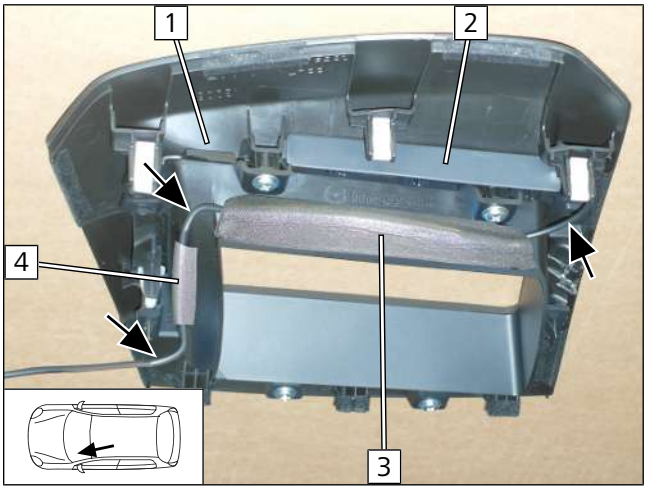


Fig. 180

▶ Glue on aerial 2 as shown and route aerial line.

▶ Fix the aerial line using the sections of self-adhesive foam at positions 3 and 4.

1 Frame of head-up display

Routing aerial line

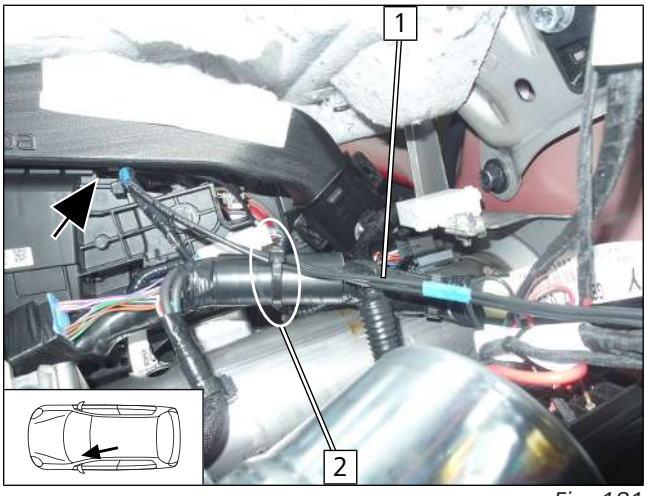


Fig. 181

▶ Route aerial line 1 as shown and fasten with cable tie 2.

14.2 ThermoCall option

Mounting receiver

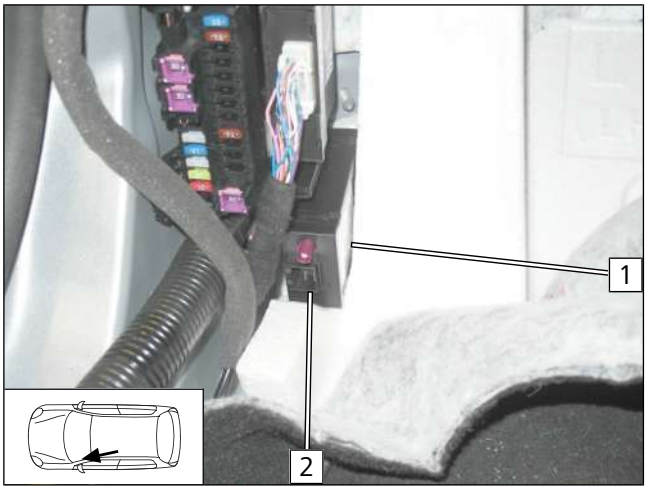


Fig. 182

Observe the ThermoCall installation documentation.

▶ Fasten receiver [2] with double-sided adhesive tape [1].

Preparing foam strip

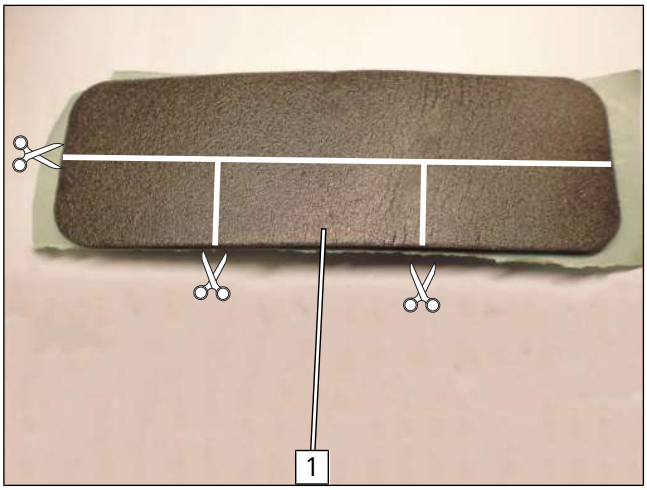


Fig. 183

▶ Cut self-adhesive foam strip [1] into three sections as shown.

Mounting aerial (optional)

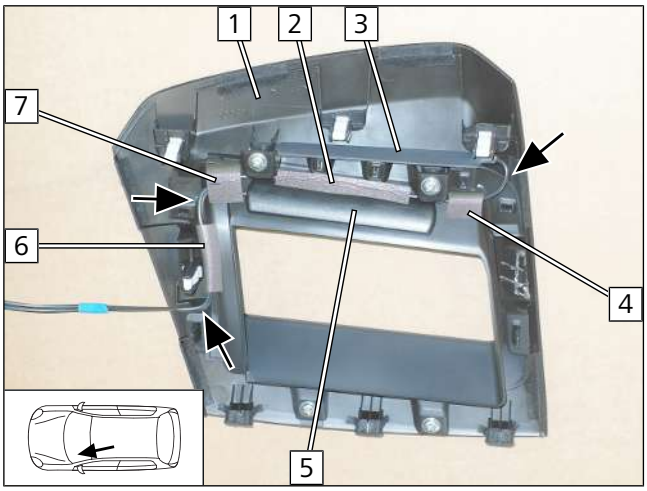


Fig. 184

▶ Glue on aerial [5] as shown and route aerial line.

▶ Fix the aerial line using the sections of self-adhesive foam at positions [2], [4], [6] and [7].

[1] Frame of head-up display

[3] Telestart aerial (optional)

Routing aerial line

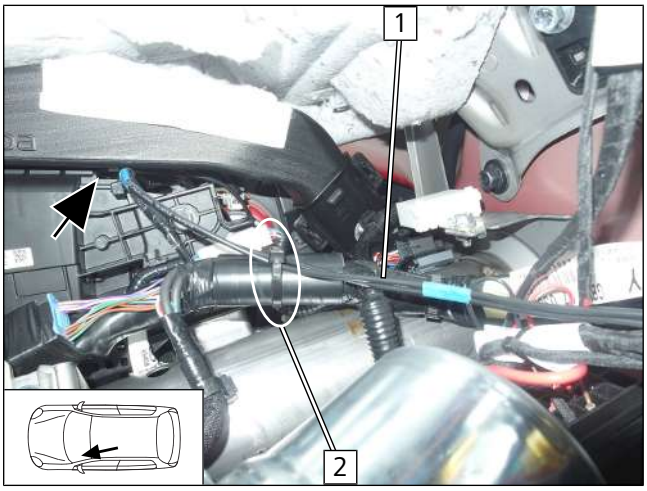


Fig. 185

▶ Route aerial line **1** as shown and fasten with cable tie **2**.

15 Final work in engine compartment

Premounting two angle brackets

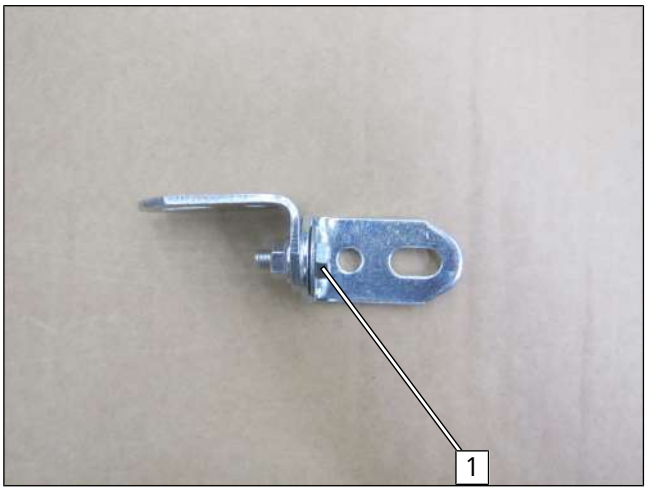


Fig. 186

1 M6x16 bolt, angle bracket [2x], flanged nut (8-10Nm)

Preparing battery box

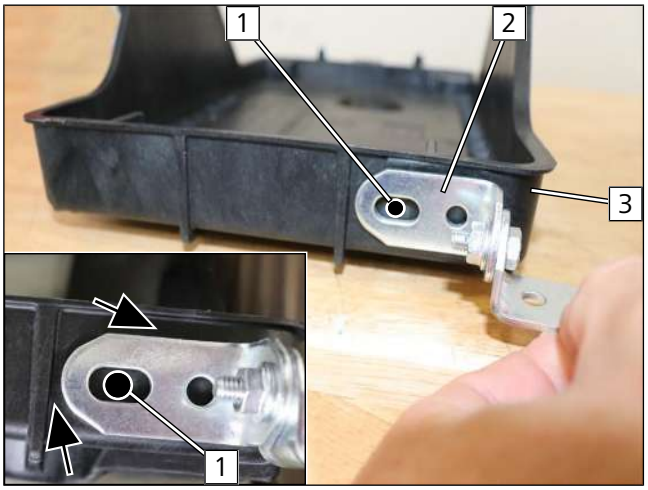


Fig. 187

Risk of breakage of the battery box at the edges

▶ Angle bracket 2 must not be mounted onto or above the edge of the battery box.

▶ Position premounted angle bracket 2 as shown, copy hole pattern 1 and drill a Ø6.5 hole.

3 Battery box

Mounting angle bracket

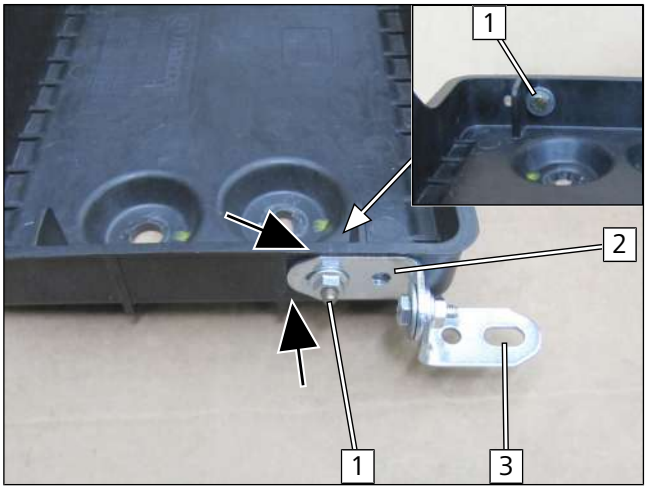


Fig. 188

Risk of breakage of the battery box at the edges

▶ Angle bracket 2 must not be mounted onto or above the edge of the battery box.

1 M6x16 bolt, large diameter washer, hole in battery carrier, premounted angle bracket, flanged nut

3 Hole for mounting coolant pump bracket at a later time

Mounting battery box loosely

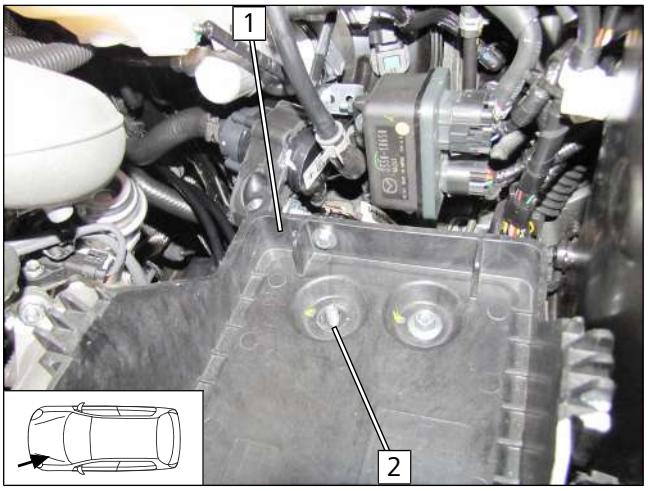


Fig. 189

1 Battery box
2 M8x70 bolt, premounted

Checking installation height

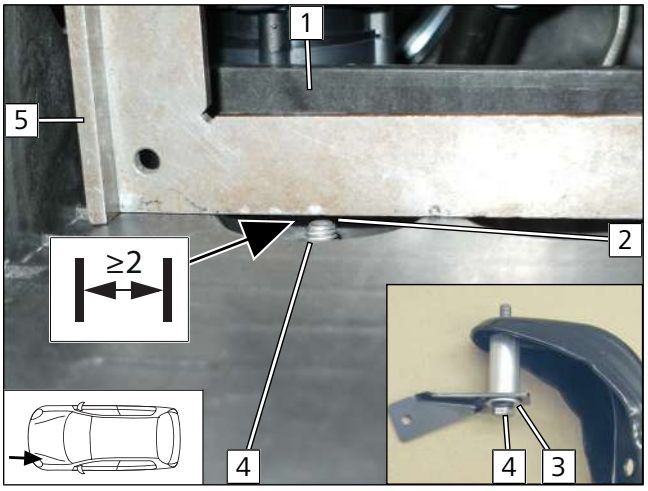


Fig. 190

▶ Check whether sufficient distance has been produced at position 2. Remove battery box, remove fastening bolt 4 and reinstall with additional washers 3 if necessary.

1 Battery box
4 M8x70 bolt, premounted
5 Try square as a checking tool

Mounting battery box and coolant pump

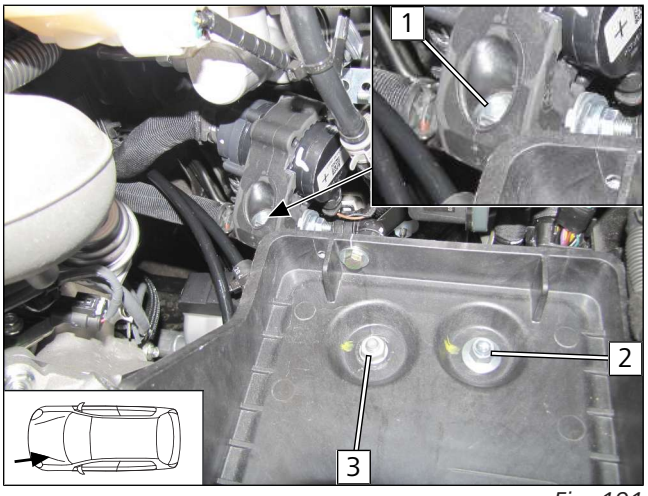


Fig. 191

Ensure sufficient distance between coolant pump and neighbouring components, correct if necessary.

>10

1 M6x25 bolt, premounted sleeve, angle bracket, flanged nut (8-10Nm)
2 Original vehicle bolt (25Nm)
3 Premounted M8x70 bolt, large diameter washer, flanged nut (25Nm)

Mounting hose bracket

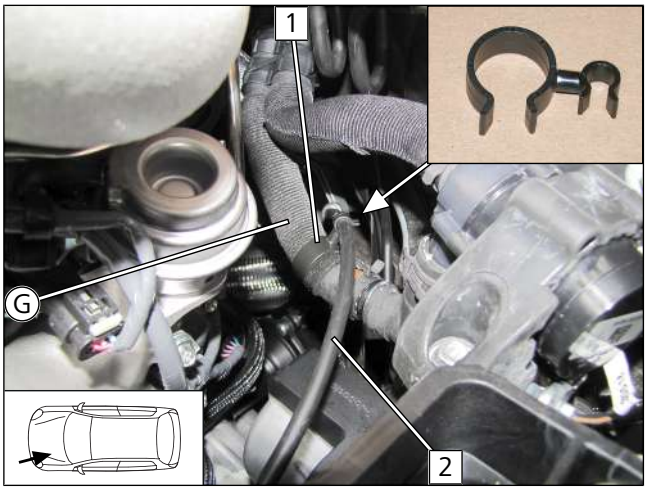


Fig. 192

Only in case of vehicle with automatic transmission

1 9x24 hose bracket

2 Automatic transmission gearshift cable

Connection to positive battery terminal

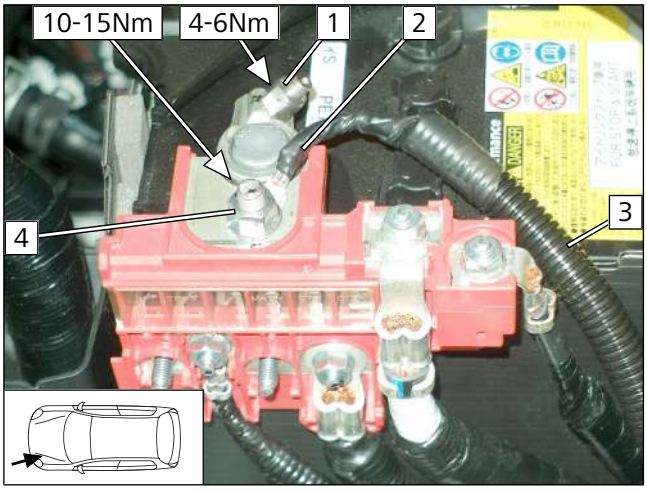


Fig. 193

DANGER

Fire hazard due to insufficient tightening torque

▶ Observe tightening torque

▶ Mounting battery.

1 Original vehicle bolt, positive battery terminal

2 Connect red (rt) wire to positive battery terminal, insulate

3 Positive wire in Ø10 corrugated tube

4 Original vehicle flanged nut

Adapting cover

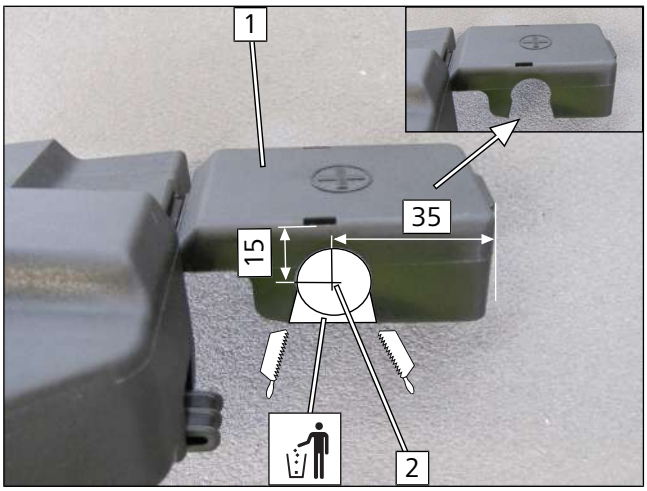


Fig. 194

▶ Drill a Ø16 hole in positive battery terminal cover 1 at position 2.

▶ In addition, remove the marked section as shown.

Mounting cover

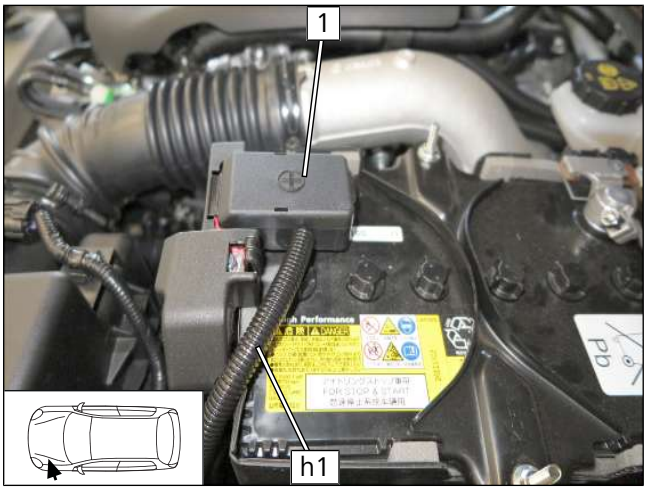
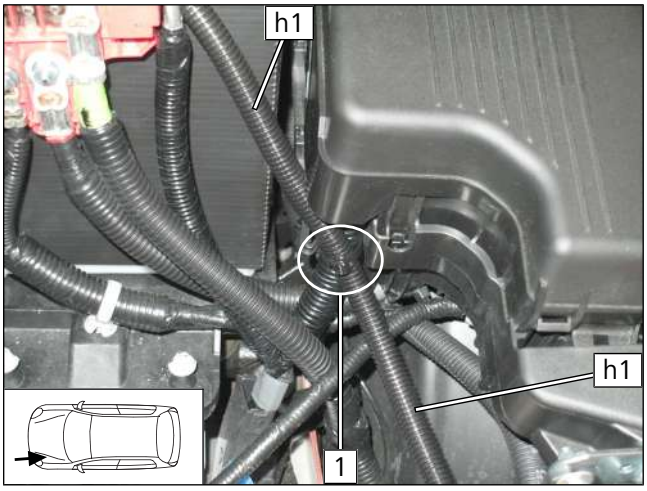


Fig. 195

1 Cover of positive battery
h1 Positive wire in Ø10 corrugated tube

Fastening corrugated tube h1



1 Cable tie

16 General final work

Further information can be found in the (MESI) vehicle manufacturer's technical documentation.

- ▶ Mount removed parts in reverse order
- ▶ Mount instrument panel trim only after checking the PWM GW

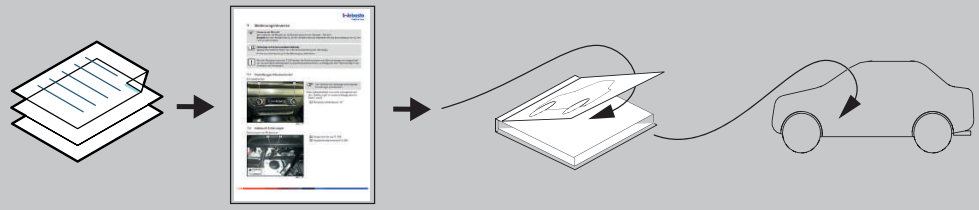
- ▶ Check all hoses, clamps and all electrical connections for firm seating
- ▶ Insulate and tie back loose lines
- ▶ Spray heater and electrical components with anti-corrosion wax (Mazda anti-corrosion wax)
- ▶ Connect the battery by performing/following the specified actions as per 'MESI REMOVING/ INSTALLING THE BATTERY [SKYACTIV-D2.2]'

Only use manufacturer-approved coolant.

- ▶ Fill and bleed the coolant circuit according to the vehicle manufacturer's specifications.

Further information can be found in the general installation and operating instructions of the Webasto components.

- ▶ Teach Telestart transmitter
- ▶ Make settings on A/C control panel according to the 'Operating Instructions'
- ▶ Initial start-up and function check



Check voltage in parking heating mode (see settings for end customers) at fan motor. Target value 4.8 - 5.6V (in driving mode, corresponds to approx. level 3). See the description below:

Measuring the voltage at the fan motor

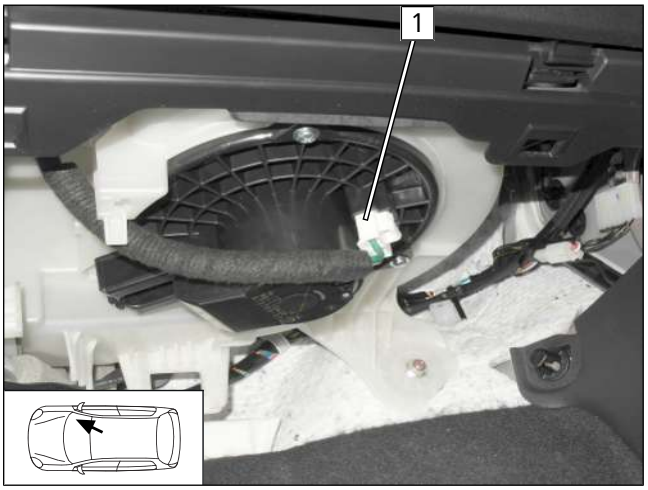
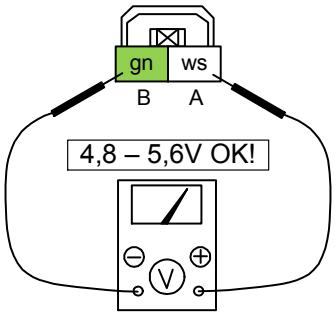


Fig. 196

Measure the voltage between the two pins.

1 2-pin connector of fan motor



Only in case of deviations to the target value:
Adjust the PWM GW value for the duty cycle via the Webasto diagnosis in increments of 2% (see the following section 'Adjusting the Fan Speed').

17 Adjusting the fan speed

Thermo Test Diagnosis overview

Thermo Test Diagnosis, Mazda order no.: 4100-77-725* (software version V3.4 and higher); free update and support via: https://dealers.webasto.com;

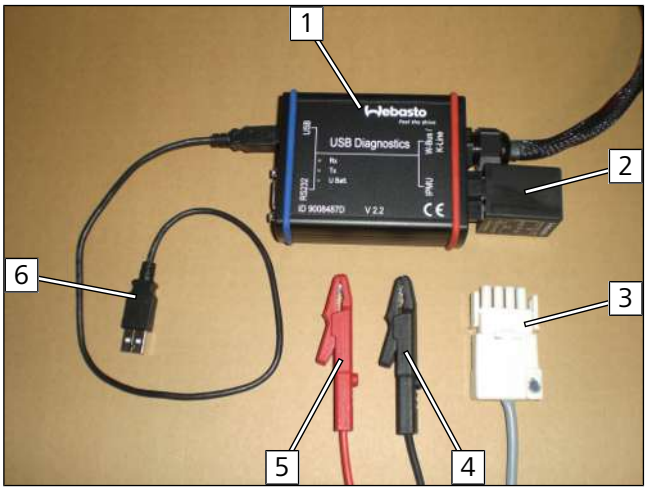


Fig. 197

1 Diagnosis Box
2 PWM GW
3 White (ws) connector not required
4 Connection to positive battery terminal
5 Connection to negative battery terminal
6 USB PC connection

Selecting PWM GW

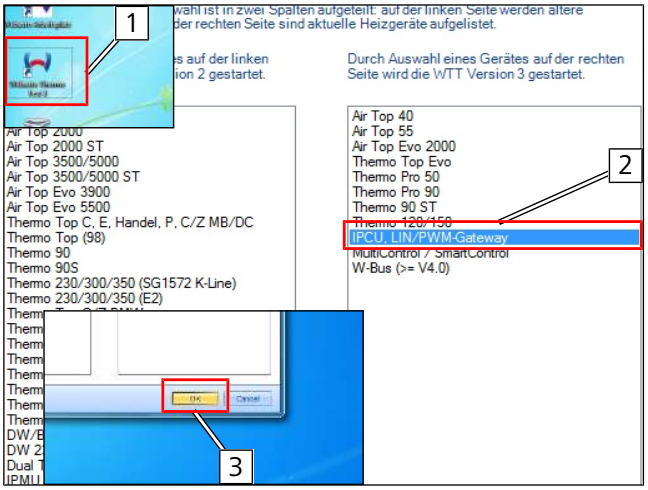


Fig. 198

▶ Establish all connections.

1 Start Webasto Thermo Test
2 'IPCU. LIN/PWM Gateway' selection
3 Confirm with 'OK'

Possible error message

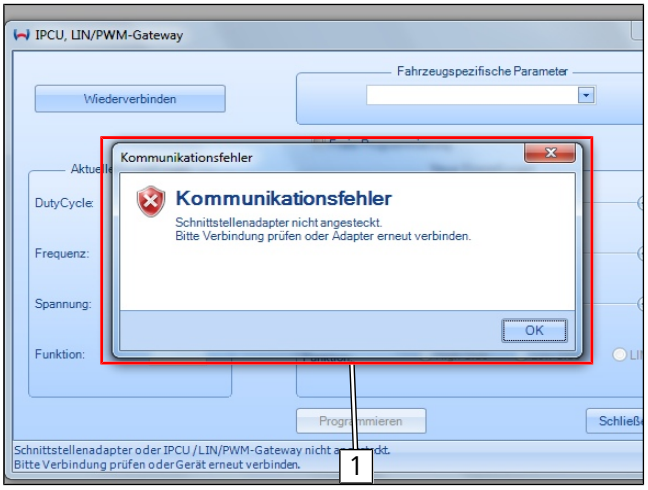


Fig. 199

▶ In the case of error message 'Communication error' 1, briefly interrupt the power supply to the diagnosis adapter and restart programming of the PWM GW.

Selecting ‘Free programming’

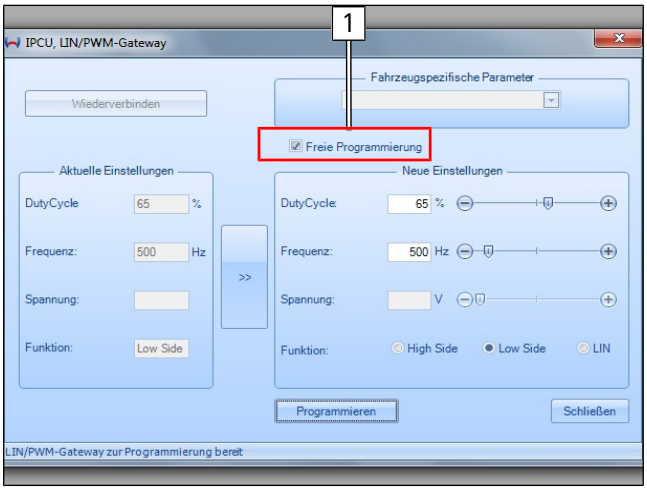


Fig. 200

1 Enable ‘Free programming’

Selecting duty cycle

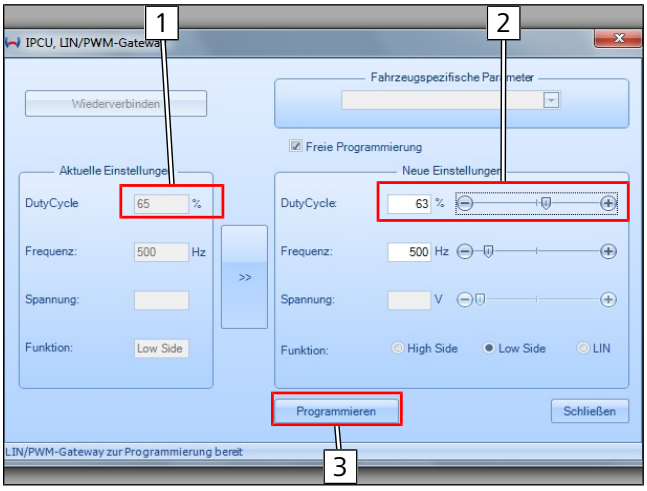


Fig. 201

Factory settings are shown on the left.

- ▶ Change duty cycle by 2%-increments.
  Enter the new value for the duty cycle on the right:
  - for speed increase - 2%
  - for speed reduction + 2%.
- ▶ Do not change the presettings for frequency and function.

1 Duty cycle 65% preset

2 Duty cycle 63% selected

3 Confirm ‘Program’

Programming PWM GW

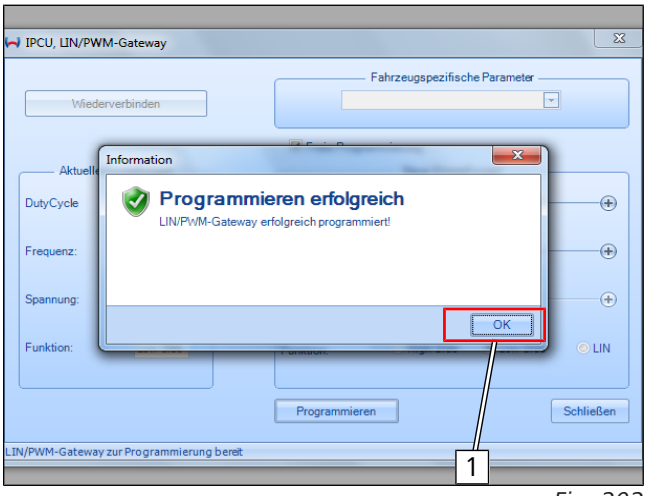


Fig. 202

1 Confirm with ‘OK’

Programming PWM GW

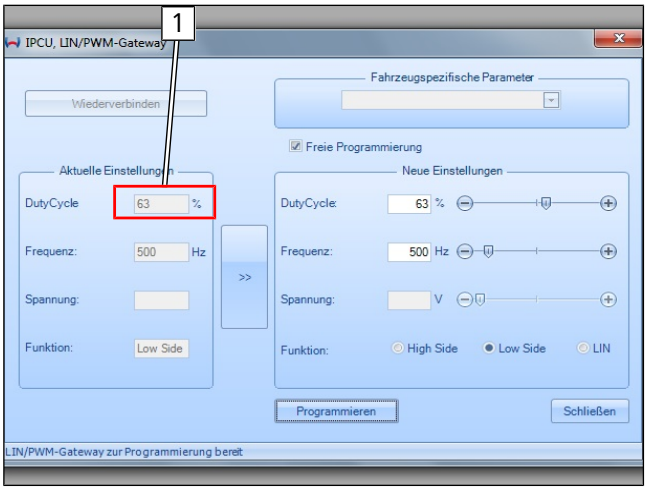


Fig. 203

The new settings are displayed on the left.

▶ Reselect the PWM GM diagnosis.
Install the PWM GW and recheck the voltage (target values 4.8 - 5.6V) via the fan motor connector. If values are different, perform further adjustments.

Performing a function check with the oscilloscope

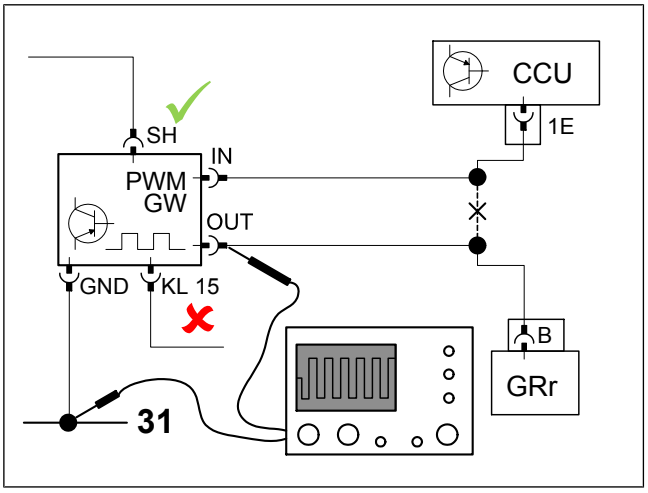
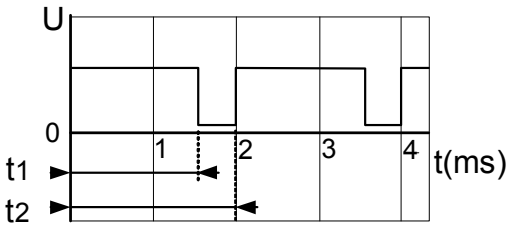


Fig. 204

▶ **Test state**:
- Heating: **ON**
- Coolant temperature: > 55 °C
- Ignition: **OFF**



Duty Cycle = t1 / t2 x 100 = 65% (or adjusted value)

Frequency = 1 / t2 = 500 Hz

These are the original instructions. The German language is binding.
You can request your language if it is missing. The telephone number of each country can be found in the Webasto service centre leaflet or the website of the respective Webasto representative of your country.

Webasto Thermo & Comfort SE
Postfach 1410
82199 Gilching
Germany

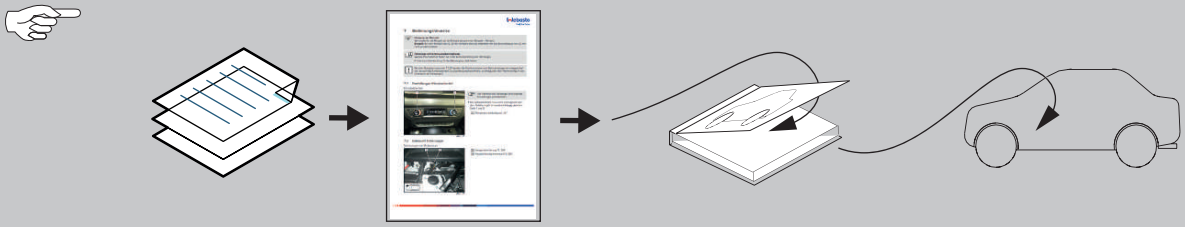
Company address:
Friedrichshafener Str. 9
82205 Gilching
Germany

Technical Extranet: https://dealers.webasto.com

CE

WWW.WEBASTO.COM

18 Operating instructions for automatic air-conditioning



The heater works independently of the engine in conjunction with the original vehicle heating and ventilation system and can be operated with the vehicle either parked or in driving mode. The heater is supplied with fuel from the vehicle fuel tank. As a result, the maximum range displayed by the instrument cluster may be different before and after operation of the heater. To protect the vehicle battery, we recommend that the heater is not operated several times in succession without the battery having the opportunity to recharge during driving mode.

Information on i-stop:

The i-stop function is disabled if battery power is low. As a result, the time until automatic switch-off function of the engine may be longer according to parking heater operation. This is not a malfunction. Depending on the vehicle use, it may be necessary to charge the vehicle battery occasionally.

Information regarding the heating time:

We recommend matching the heating time to the driving time (heating time = driving time)
Example: for a driving time of approx. 20 min. (in one direction), we recommend not exceeding a switch-on time of 20 min.

Note for parking heater function

Your vehicle is equipped with a passenger compartment and engine preheating unit.

18.1 A/C control panel settings

Automatic A/C control panel

Fig. 205

Before parking the vehicle, make the following settings:

1 Set temperature on both sides to 'max.'
2 Air outlet to windscreen

Setting the fan speed is not required, it will automatically be set to approx. 1/3.

18.2 Installation location of fuses

Fuses in engine compartment

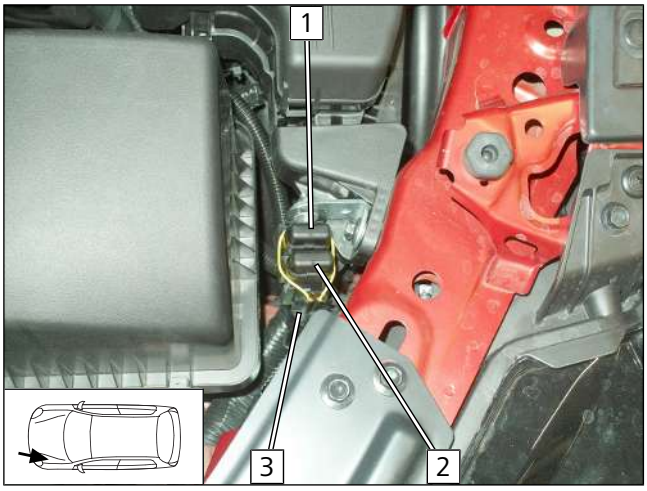


Fig. 206

1 F2 - 30A main fuse of passenger compartment
2 F1 – 20A heater main fuse
3 Heater diagnosis connection

Fuses in passenger compartment

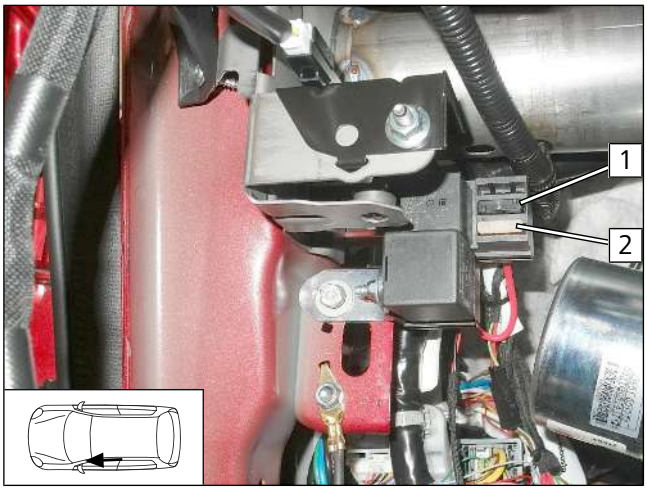


Fig. 207

1 F3 - 1A control element fuse
2 F4 - 25A fan controller fuse