Water Heater

Thermo Top Evo Parking Heater

E1
00 0258

Installation Documentation
Mazda CX5

Validity

Manufacturer	Model	Type	EG BE No. / ABE	VIN
Mazda	CX5	KF	e13*2007/46*1803* ...	JMZKF******600001-

Motorisation	Fuel	Emission standard	Transmission type	Output in kW	Displacement in cm³	Engine code
2.2 D	Diesel	Euro 6	6-speed SG	110	2191	SH
2.2 D	Diesel	Euro 6	6-speed AG	110	2191	SH
2.2 D	Diesel	Euro 6	6-speed SG	129	2191	SH
2.2 D	Diesel	Euro 6	6-speed AG	129	2191	SH

SG = manual transmission
AG = automatic transmission

From model year 2017
Left-hand drive vehicle

Verified equipment variants: 2 zone automatic air-conditioning
Manual air-conditioning
LED front fog lights
Halogen main headlights
LED headlights
Headlight washer system
2WD / 4WD
i-Stop (Start-Stop)
Daytime running lights fitted in headlight ex-works/ retrofitted in bumper

Exclusion: Alarm system (passenger compartment monitoring can lead to faults)

Total installation time: approx. 8.5 hours

Mazda CX5

Table of Contents

Necessary Components

Description	Mazda Order No.:
Basic delivery scope of Thermo Top Evo	**4100-78-774A**
Installation kit Mazda CX5 2017 Diesel	**4100-78-788D**
In case of Telestart, heater control, as well as indicator lamp in consultation with end customer	MAZDA ACCESSORY BASE

Installation Instructions

Arrange for the vehicle to be delivered with the tank only about ¼ full.
The installation location of the push button in case of Telestart or ThermoCall should be confirmed with the end customer.

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.

Information on Operating and Installation Instructions

1 Important information (not complete)

1.1 Installation and repair

The improper installation or repair of Webasto heating and cooling systems can cause fire or the leakage of deadly carbon monoxide, leading to serious injury or death.

To install and repair Webasto heating and cooling systems you need to have completed a special company training course and have the appropriate technical documentation, special tools and special equipment.

Installation and repair may ONLY be carried out by persons trained and certified in a Webasto training course. NEVER try to install or repair Webasto heating or cooling systems if you have not completed a Webasto training course, you do not have the necessary technical skills and you do not have the technical documentation, tools and equipment available to ensure that you can complete the installation and repair work properly.

Only use genuine Webasto parts. See the Webasto air and water heaters accessories catalogue for this purpose.

1.2 Operation

To ensure safe operation, we recommend having the heater checked every two years by an authorised Webasto dealer, especially when used over a long period and/or under extreme environmental conditions.

Do not operate the heater in closed rooms due to the danger of poisoning and suffocation.

Always switch off the heater before refuelling.

The heater may only be used with the prescribed fuel diesel (DIN EN 590) or petrol (DIN EN 228).

The heater may not be cleaned with a high-pressure cleaner.

1.3 Please note

ALWAYS follow all Webasto installation and operating instructions and observe all warnings.

To become familiar with and understand all functions and properties of the heater, the operating instructions must be read carefully and observed at all times.

For proper, safe installation and repair work, the installation instructions with all warnings and safety information must be carefully read and observed at all times. Please always contact a workshop authorised by Webasto for all installation and repair work.

Important

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, 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.

Sharp edges should be fitted with rub protection. 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.

2 Statutory regulations governing installation

Guidelines	TT-Evo
Heating Directive ECE R122	E1 00 0258
EMC Directive ECE R10	E1 04 5627

Note

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.

Important

Failure to follow the installation instructions will result in the invalidation of the type approval for the heater and therefore invalidation of the general **homologation of the vehicle**.

Note

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

2.1 Excerpt from ECE regulation 122 (heating system) paragraph 5 for the installation of the heater

Beginning of excerpt.

ANNEX VII

REQUIREMENTS FOR COMBUSTION HEATERS AND THEIR INSTALLATION

1. GENERAL REQUIREMENTS

1.7.1. A clearly visible tell-tale in the operator's field of view shall inform when the combustion heater is switched on or off.

2. VEHICLE INSTALLATION REQUIREMENTS

2.1. Scope

2.1.1. Subject to paragraph 2.1.2. combustion heaters shall be installed according to the requirements of this Annex.

2.1.2. Vehicles of category O having liquid fuel heaters are deemed to comply with the requirements of this Annex.

2.2. Positioning of heater

2.2.1. Body sections and any other components in the vicinity of the heater must be protected from excessive heat and the possibility of fuel or oil contamination.

2.2.2. The combustion heater shall not constitute a risk of fire, even in the case of overheating. This requirement shall be deemed to be fulfilled if the installation ensures an adequate distance to all parts and suitable ventilation, by the use of fire resistant materials or by the use of heat shields.

2.2.3. In the case of M2 and M3 vehicles, the heater must not be positioned in the passenger compartment. However, an installation in an effectively sealed envelope which also complies with the conditions in paragraph 2.2.2 may be used.

2.2.4. The label referred to in paragraph 1.4 or a duplicate, must be positioned so that it can be easily read when the heater is installed in the vehicle.

2.2.5. Every reasonable precaution should be taken in positioning the heater to minimise the risk of injury and damage to personal property.

2.3. Fuel supply

2.3.1. The fuel filler must not be situated in the passenger compartment and must be provided with an effective cap to prevent fuel spillage.

2.3.2. In the case of liquid fuel heaters, where a supply separate to that of the vehicle is provided, the type of fuel and its filler point must be clearly labelled.

2.3.3. A notice, indicating that the heater must be shut down before refuelling, must be affixed to the fuelling point. In addition a suitable instruction must be included in the manufacturer's operating manual.

2.4. Exhaust system

2.4.1. The exhaust outlet must be located so as to prevent emissions from entering the vehicle through ventilators, heated air inlets or opening windows.

2.5. Combustion air inlet

2.5.1. The air for the combustion chamber of the heater must not be drawn from the passenger compartment of the vehicle.

2.5.2. The air inlet must be so positioned or guarded that blocking by rubbish or luggage is unlikely.

2.6. Heating air inlet

2.6.1. The heating air supply may be fresh or recirculated air and must be drawn from a clean area not likely to be contaminated by exhaust fumes emitted either by the propulsion engine, the combustion heater or any other vehicle source.

2.6.2. The inlet duct must be protected by mesh or other suitable means.

2.7. Heating air outlet

2.7.1. Any ducting used to route the hot air through the vehicle must be so positioned or protected that no injury or damage could be caused if it were to be touched.

2.7.2. The air outlet must be so positioned or guarded that blocking by rubbish or luggage is unlikely.

End of excerpt.

In multilingual versions the German language is binding.

Information on Validity

This installation documentation applies to Mazda CX5 Diesel vehicles - for validity, see page 1 - from model year 2017 and later, 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.

Technical Information

Special Tools
- Hose clamp pliers for auto-tightening hose clamps
- Hose clamp pliers for Clic hose clamps of type W
- Automatic wire stripper 0.2 - 6mm²
- Crimping pliers for cable lug / tab connector 0.5 - 6mm²
- Torque wrench for 2.0 - 10 Nm
- Hose clamping pliers
- Metric thread-setter kit
- Deep-hole marker
- Webasto Thermo Test Diagnosis with current software

Dimensions
- All dimensions are in mm.

Tightening torque values
- Tightening torques values of 5x13 heater stud bolts and heater bolts = 8Nm!
- Tightening torque value of 5x15 water connection piece retaining plate bolt = 7Nm.
- Tighten other bolt connections in accordance with manufacturer's instructions or in accordance with state-of-the-art-technology.
- Any additionally indicated tightening torques have been specified by the vehicle manufacturer!

Explanatory Notes on Document

You will find an identification mark on the outside top right corner of the page in question to provide you with a quick overview of the individual working steps.

Mechanics **Electrics** **Coolant Circuit** **Combustion Air** **Fuel** **Exhaust Gas** **Software**

Special features are highlighted using the following symbols:

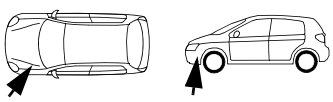
Specific risk of damage to components.

Specific risk due to electrical voltage.

Specific risk of fire or explosion.

Reference to a special technical feature.

The arrow in the vehicle icon indicates the position on the vehicle and the viewing angle.



Reference to the manufacturer's vehicle-specific documents.

Reference to specific installation instructions of Webasto components (demonstrated with the example of the FuelFix).

Reference to general installation instructions of Webasto components.

Tightening torque according to the manufacturer's vehicle-specific documents.

Spray components with anti-corrosion wax corresponding to the vehicle-specific documentation or Tectyl 100K

Preliminary Work

Before installing the heater

The incorrect execution of electrical connections can cause fire!

Warning:
The Mazda CX5 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.

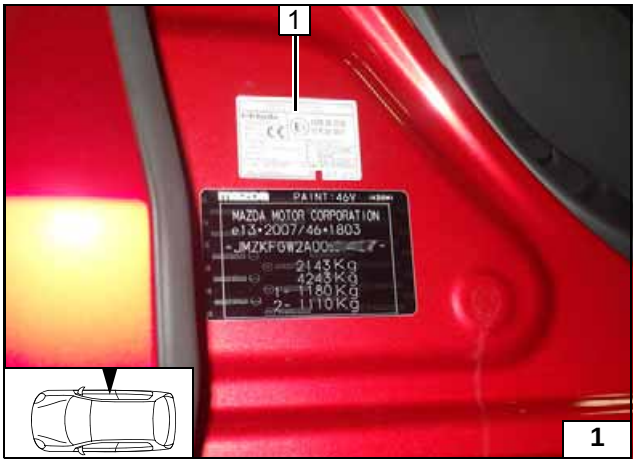
See the following table:

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!

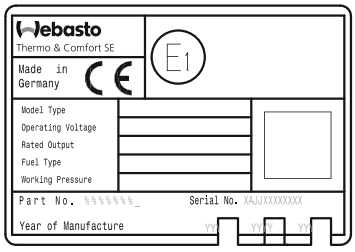
Vehicle

- Open the fuel tank cap.
- Ventilate the fuel tank.
- Close the fuel tank cap again.
- Depressurise the cooling system.
  See MESI ‘CHECKING THE COOLANT LEVEL’.
- Disconnect and completely remove the battery together with the carrier.
  See MESI ‘REMOVING/INSTALLING THE BATTERY’.
- Remove the lower engine cover.
  See MESI ‘REMOVING/INSTALLING THE FRONT UNDERBODY NO.2’.
- Remove the left underbody trim (2 parts).
  See MESI ‘REMOVING/INSTALLING THE UNDERBODY’.
- Remove the wheel well trim on the right-hand side.
  See MESI ‘REMOVING/INSTALLING THE SPLASH GUARD’.
- Remove the front bumper.
  See MESI ‘REMOVING/INSTALLING THE FRONT BUMPER’.
- Detach and fold back the left rear bench seat.
  See MESI ‘REMOVING/INSTALLING THE REAR SEAT UPHOLSTERY’.
- Open the left tank-fitting service lid.
  See MESI ‘REMOVING/INSTALLING THE FUEL TANK SENSOR’.
- Remove the front entrance strip on the driver's side.
  See MESI ‘REMOVING/INSTALLING THE FRONT DOOR SILL STRIP’.
- Remove the front left footwell trim.
  See MESI ‘REMOVING/INSTALLING THE FOOTWELL SIDE TRIM’.
- Detach the instrument panel trim under the steering wheel.
  See MESI ‘REMOVING/INSTALLING THE LOWER INSTRUMENT PANEL TRIM’.
- Remove the trim under the glove box.
  See MESI ‘REMOVING/INSTALLING THE LOWER INSTRUMENT COVER’.
- Remove the glove box.
  See MESI ‘REMOVING/INSTALLING THE GLOVE BOX’.
- Remove the front left loudspeaker cover.
  See MESI ‘REMOVING/INSTALLING THE LOUDSPEAKER COVER’.
- Remove the A-pillar trim on the left.
  See MESI ‘REMOVING/INSTALLING THE A-PILLAR TRIM’.

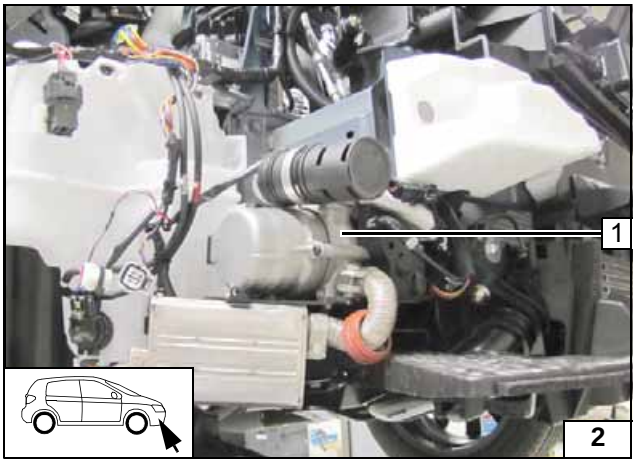
Heater



Remove years that do not apply from the type and duplicate label.
Stick duplicate label **1** on the B-pillar as shown.



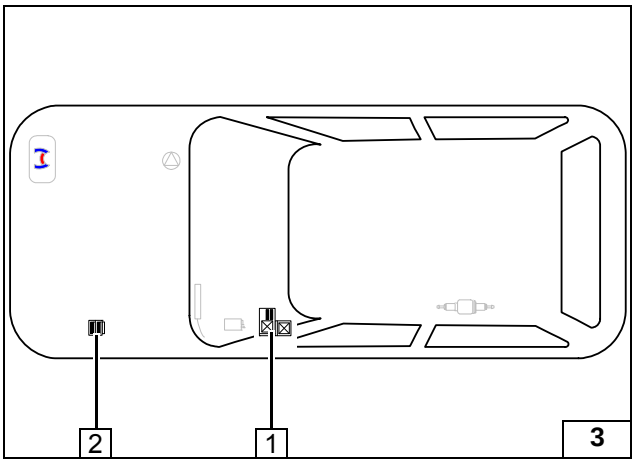
Affixing duplicate label



Heater Installation Location

1 Heater

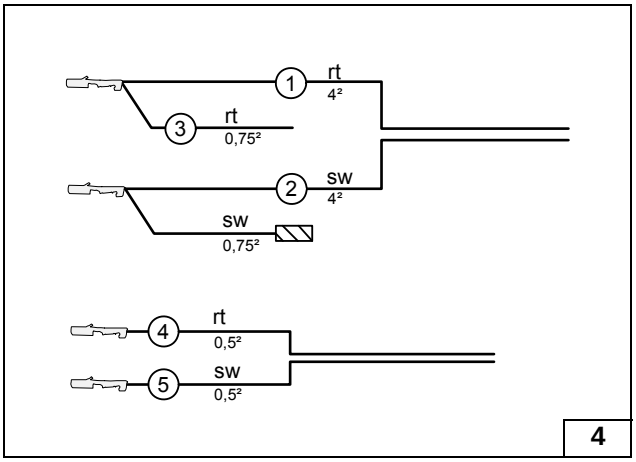
Installation location



Preparation of the Electrical System

1 Passenger compartment relay and fuse holder
2 Engine compartment fuse holder

Installation overview

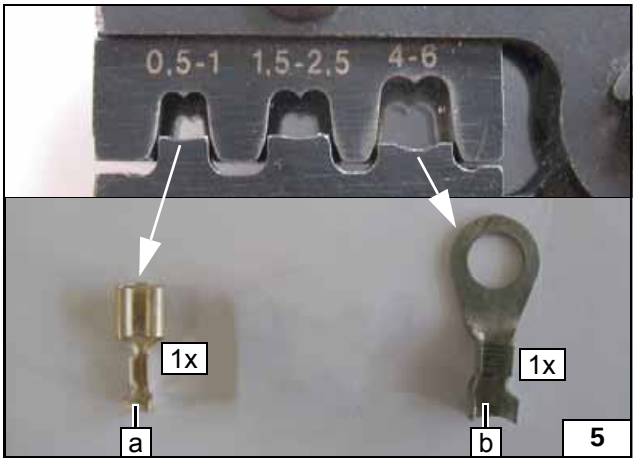


Wire sections retain their numbering in the entire document.

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

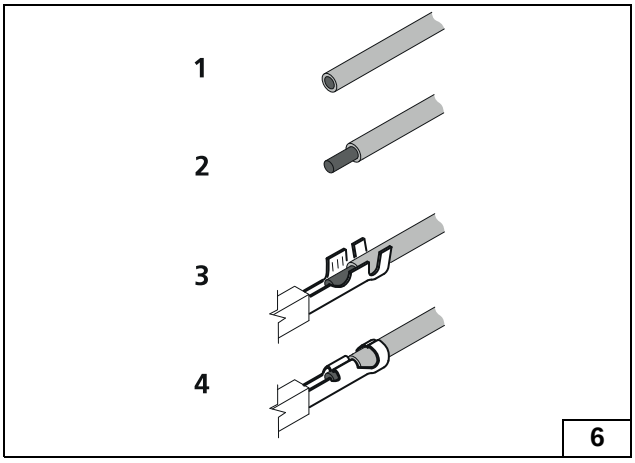
Assigning wires

① Red (rt) wire of fan wiring harness
② Black (sw) wire of fan wiring harness
③ Red (rt) wire of fan wiring harness
④ Red (rt) wire from wiring harness of PWM control
⑤ Black (sw) wire from wiring harness of PWM control



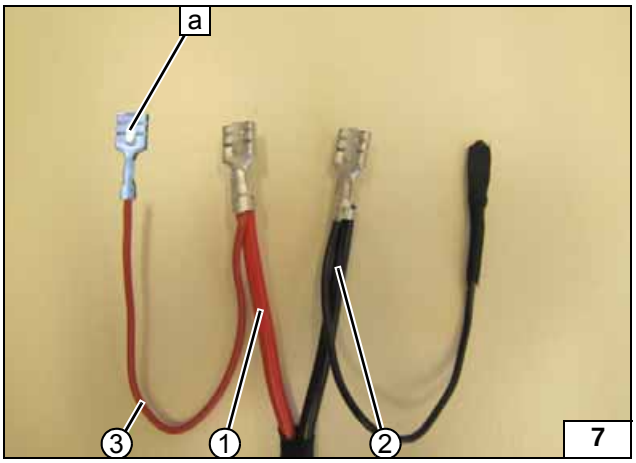
a 6.3 contact for 0,5 - 1 mm² wire cross-section
b 8mm dia. cable lug for 4,0 - 6,0 mm²

Contact overview



Instructions for connecting the contacts

Preparing fan wiring harness



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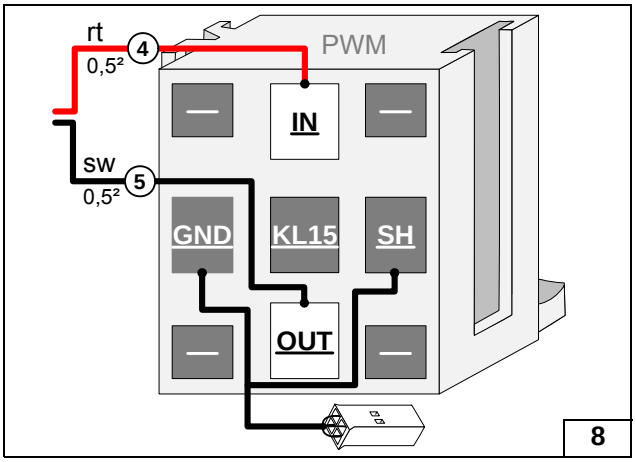
Install blade receptacle **a.**

① 4mm² red (rt) wire from fan wiring harness for K1/87a
② 4mm² black (sw) wire from fan wiring harness for K1/30
③ 0,75² red (rt) wire from fan wiring harness for PWM GW/KL15

Connecting wires to PWM GW socket



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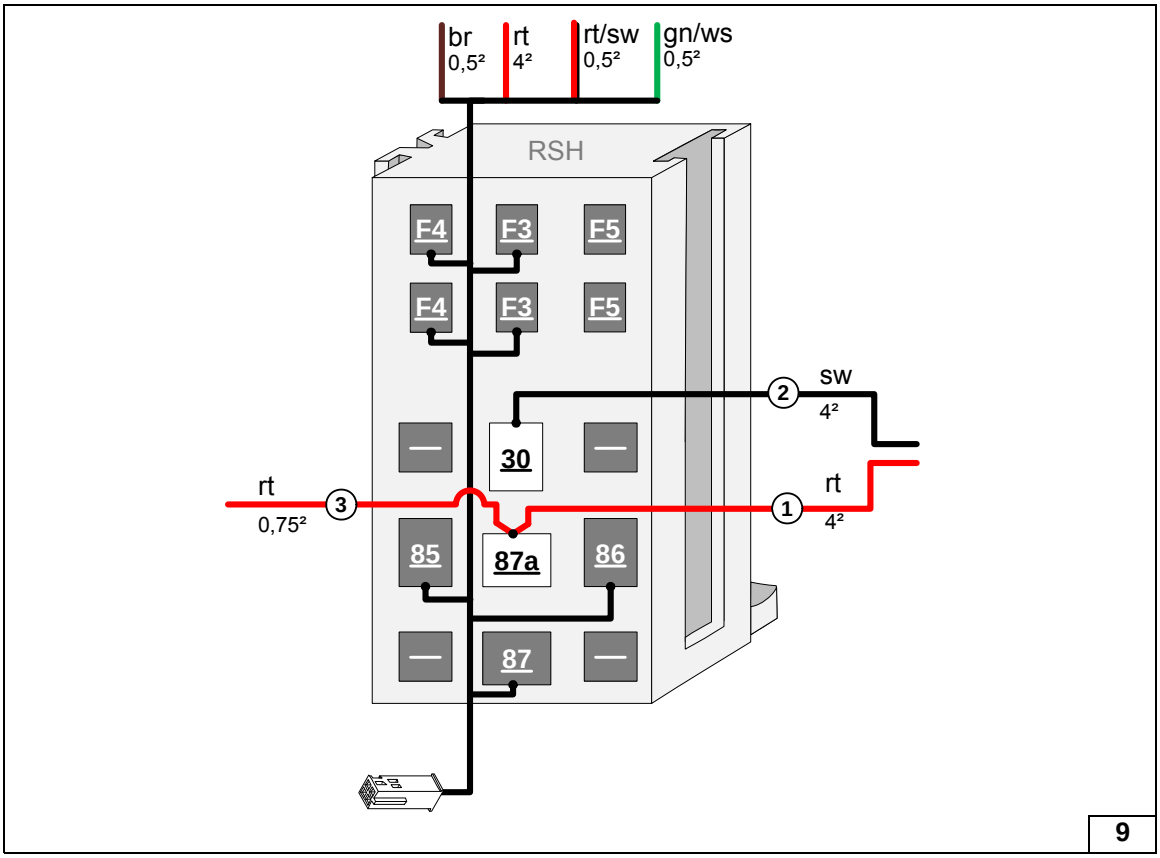
④ Red (rt) wire from wiring harness of PWM control
⑤ Black (sw) wire from wiring harness of PWM control

Connecting wires to passenger compartment relay and fuse holder



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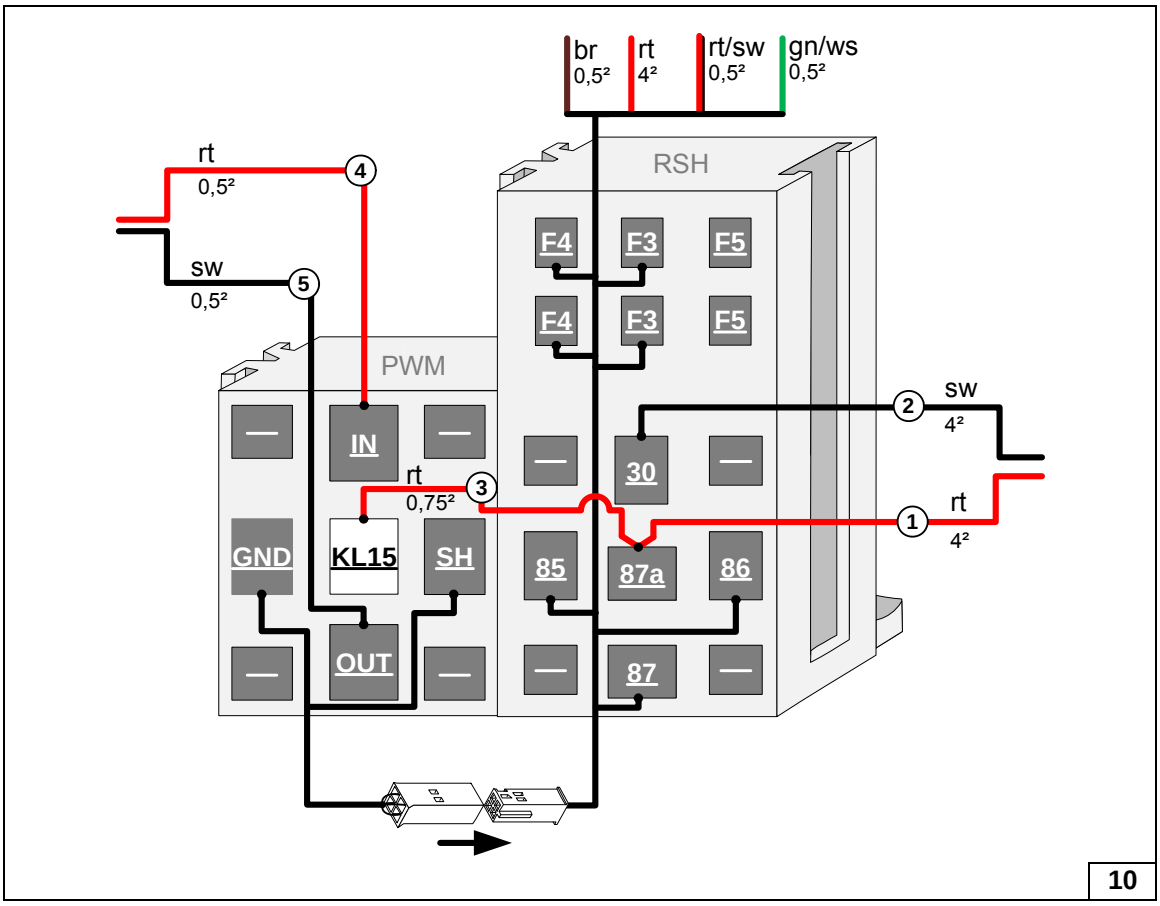

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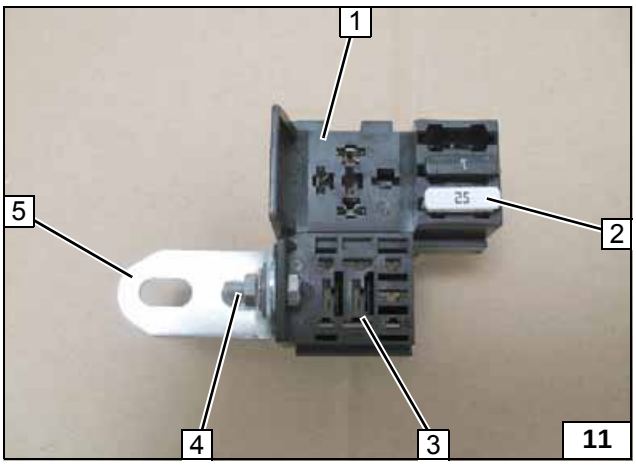
Interlocking PWM GW and passenger compartment relay and fuse holder sockets, connecting bushing with connector, connecting wire



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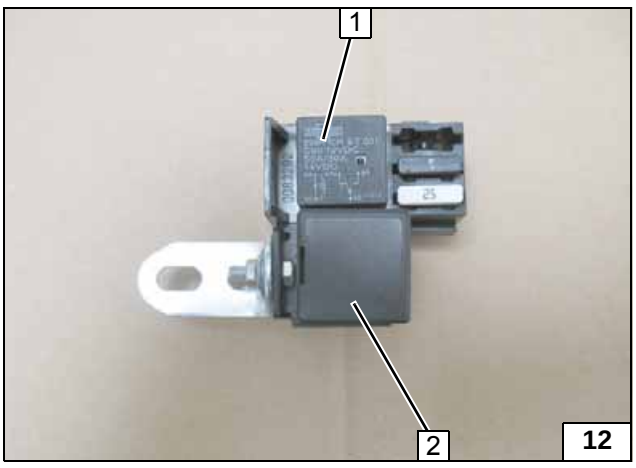
1 Passenger compartment relay and fuse holder
2 25A fuse F4
3 PWM GW socket
4 M5x16 bolt, large diameter washer, nut (5-6Nm)
5 Angle bracket

Preparing passenger compartment relay and fuse holder and PWM GW socket



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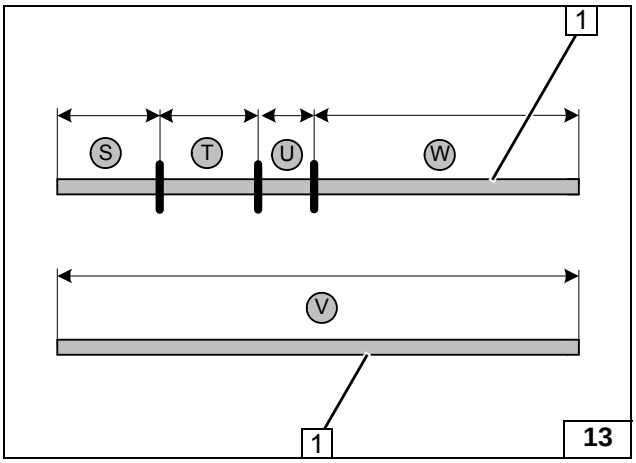
1 Relay K1
2 PWM GW

Mounting relay K1 and PWM GW

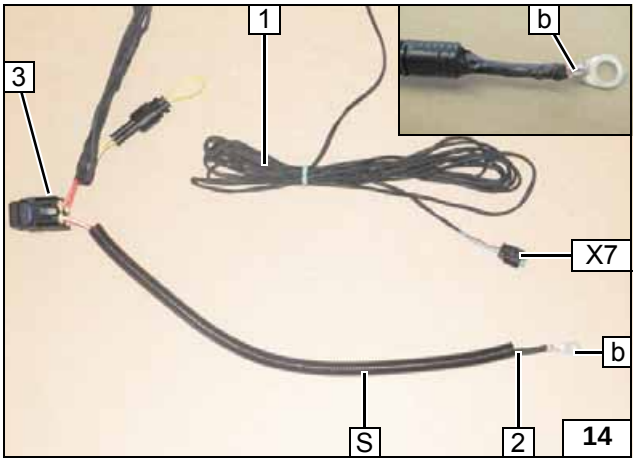
Cutting corrugated tube to length



1 10 mm dia. corrugated tube [2x]

S = 400
T = 400
U = 250
V = 2100
W = 1050

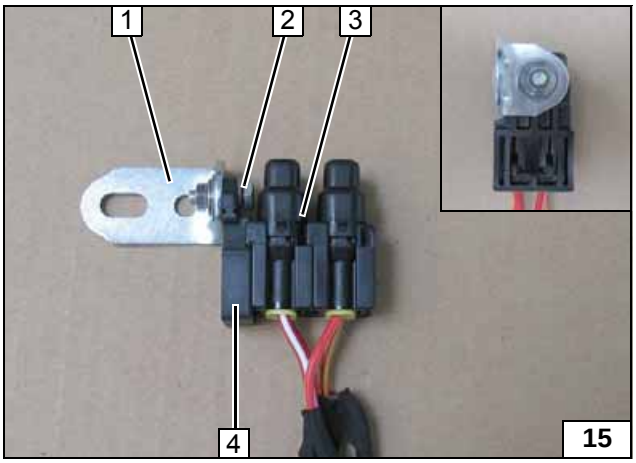
Preparing wiring harness



Insert red (rt) wire from B+ in 10mm dia. corrugated tube **S**. Mount cable lug **b** onto red (rt) wire from B+ **2**.

1 Wiring harness of metering pump
2 Red (rt) wire from B+
3 Engine compartment fuse holder
X7 Connector of metering pump wiring harness

Preparing fuse holder



1 Angle bracket
2 M5x16 bolt, large diameter washer [2x], nut (5-6Nm)
3 Fuses F1-2
4 Retaining plate of fuses

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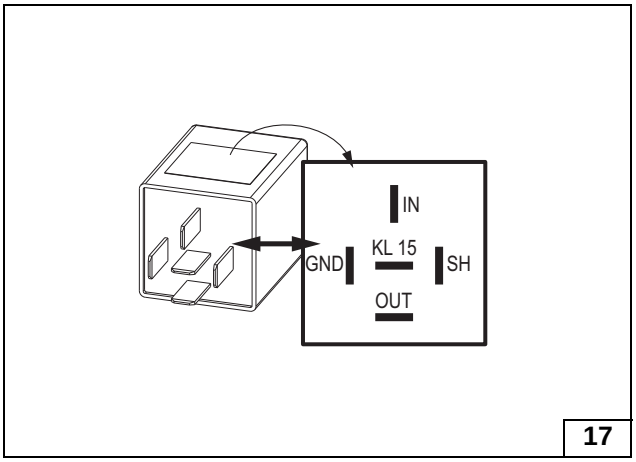
Preparation of the PWM GW (Pulse Width Modulator)

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

View of PWM GW



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

Settings:

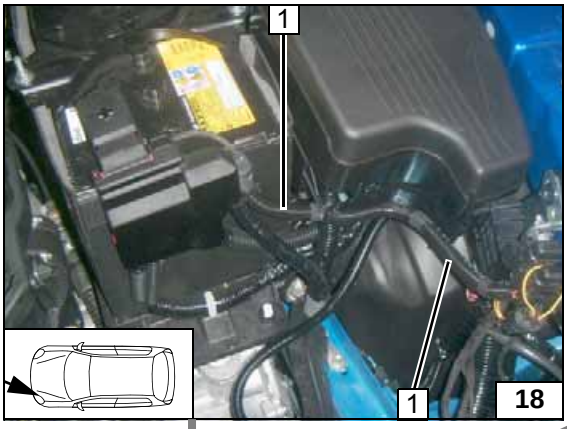
Duty cycle: 65%
Frequency: 500Hz
Voltage: not relevant
Function: Low side

View of PWM GW

Electrical System

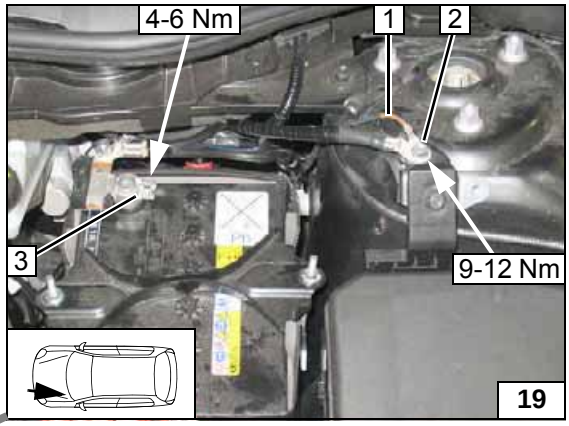
Positive wire

1 Route red (rt) wire of B+ in 10mm dia. corrugated tube **S** to positive battery terminal. (For connection to positive battery terminal, see 'Final Work' section)

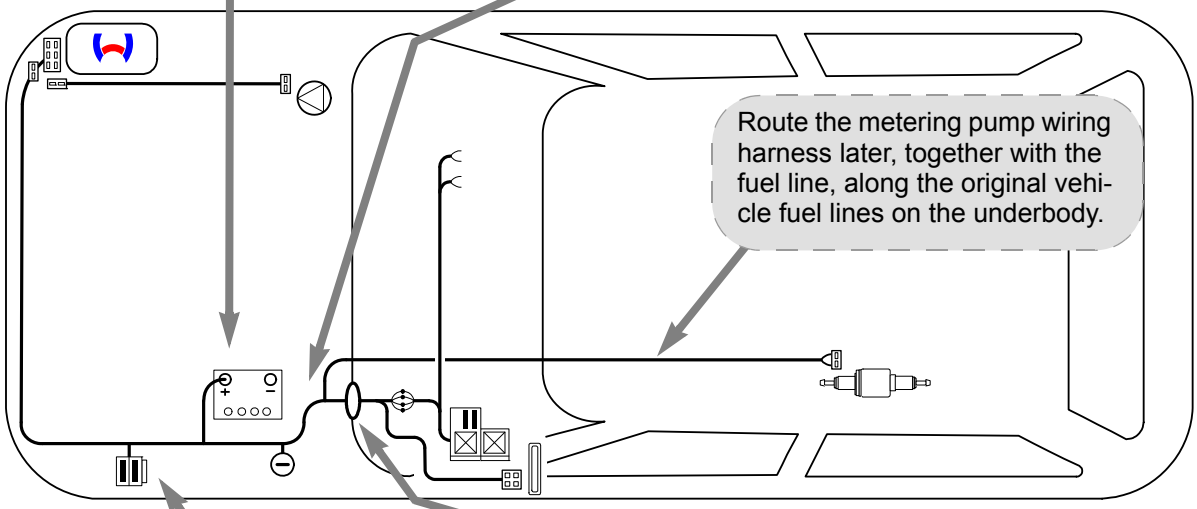


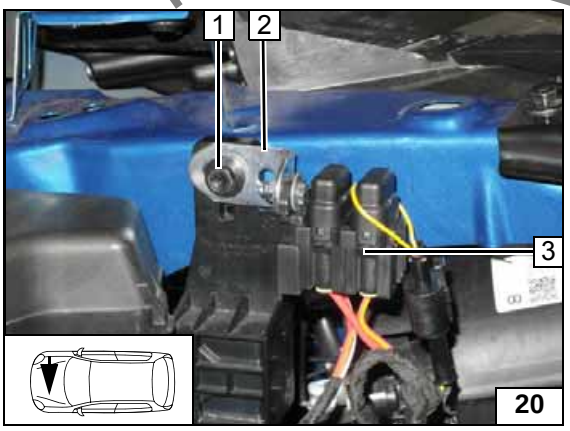
Earth wire

1 Earth wire on earth support point
2 Original vehicle earth support point
3 Original bolt of battery negative terminal (only during 'Final Work')



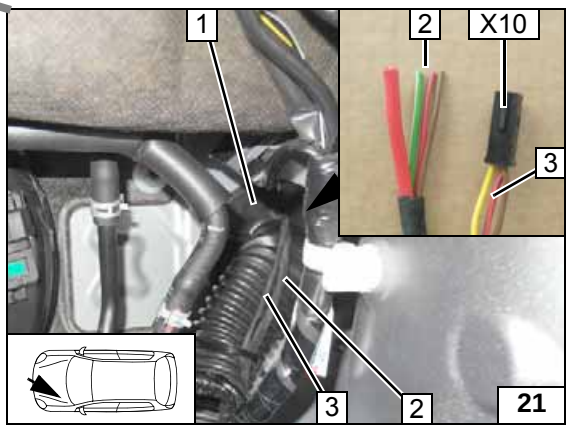
Wiring harness routing diagram





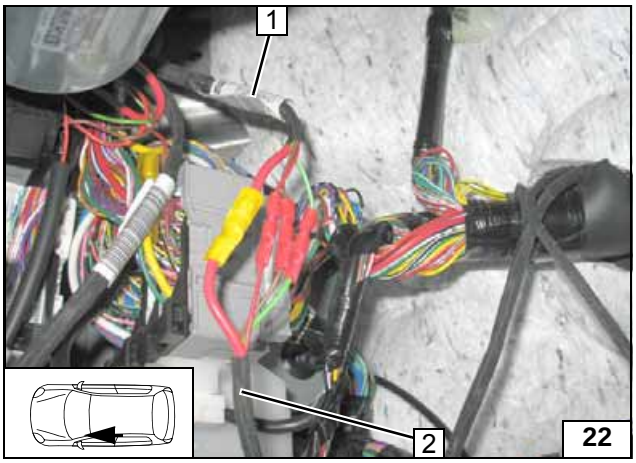
Engine compartment fuse holder

1 Original vehicle bolt (8-10Nm)
2 Angle bracket
3 Fuses F1-2



Wiring harness pass through

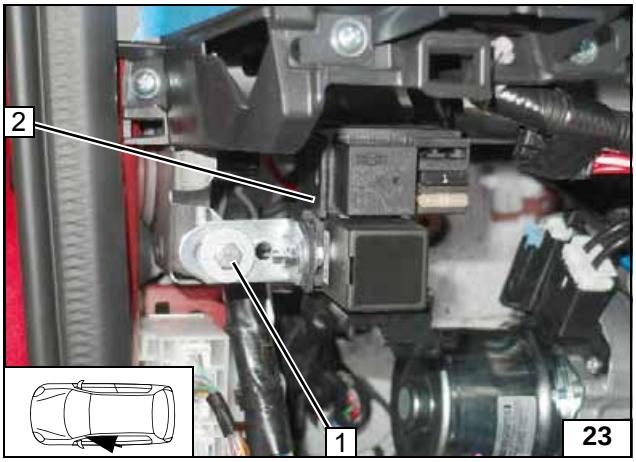
1 Protective rubber plug
2 Wiring harness for fan controller
3 Wiring harness for heater control



Red (rt) wire (4,0mm²) with red (rt) wire (4,0mm²)
Red/black (rt/sw) wire (0,5mm²) with red/black (rt/sw) wire (0,5mm²)
Green/white (gn/ws) wire (0.75mm²) with green/white (gn/ws) wire (0.5mm²)
Brown (br) wire (0.5mm²) with brown (br) wire (0,5mm²)

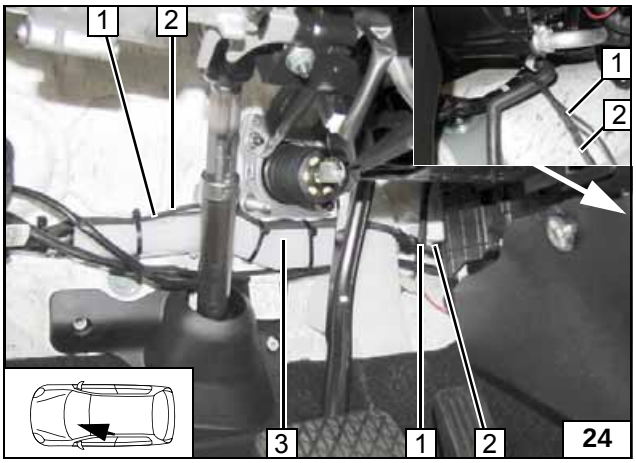
1 Passenger compartment relay and fuse holder wiring harness
2 Heater wiring harness

Connecting same colour wires of wiring harnesses



1 M6x20 bolt, large diameter washer, premounted angle bracket (8-10Nm), existing thread
2 Premounted passenger compartment relay and fuse holder and PWM GW

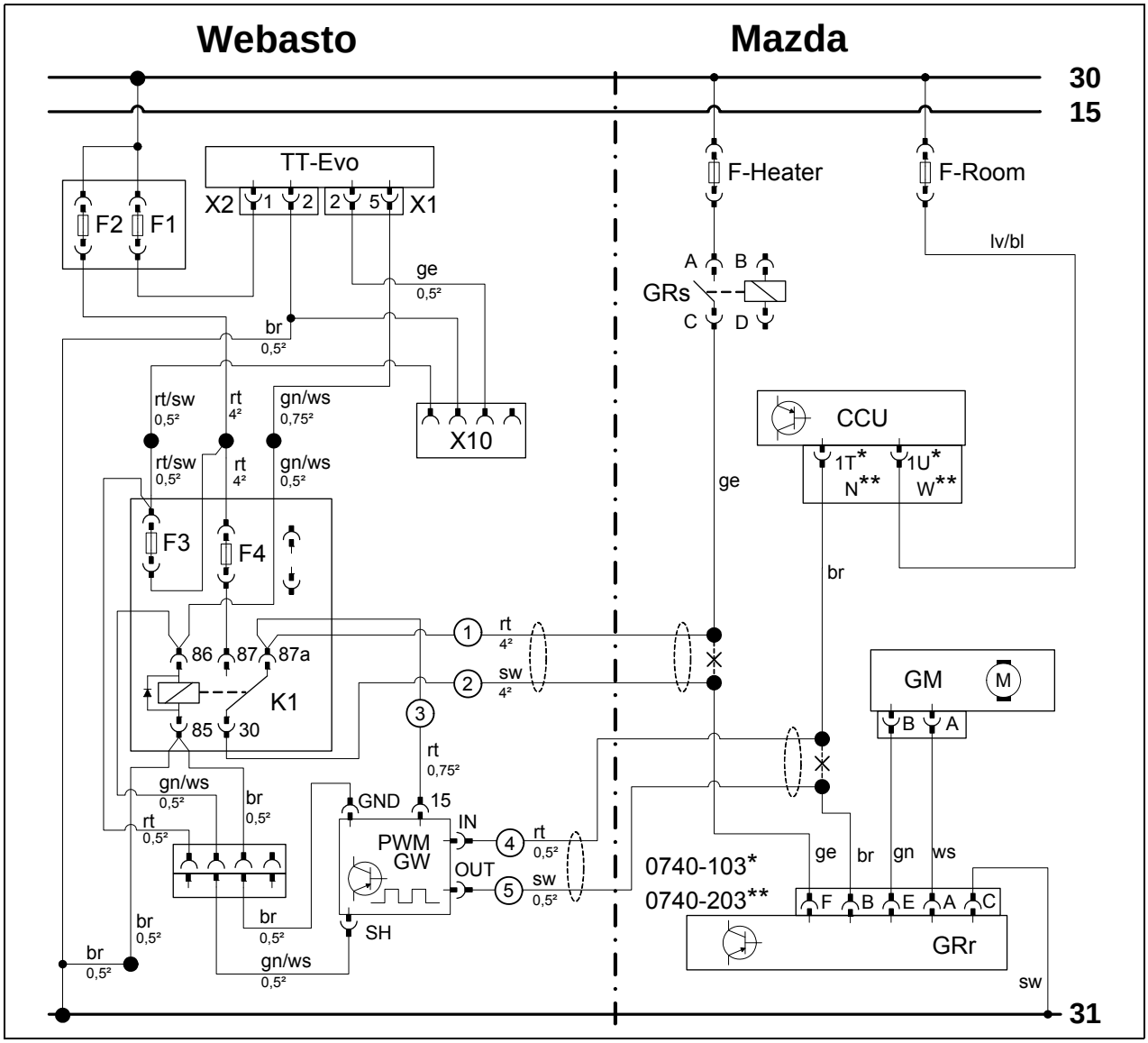
Installing PWM GW



Route fan wiring harness **1** and wiring harness of PWM control **2** on line duct **3** to the front passenger's side.

Routing wiring harnesses

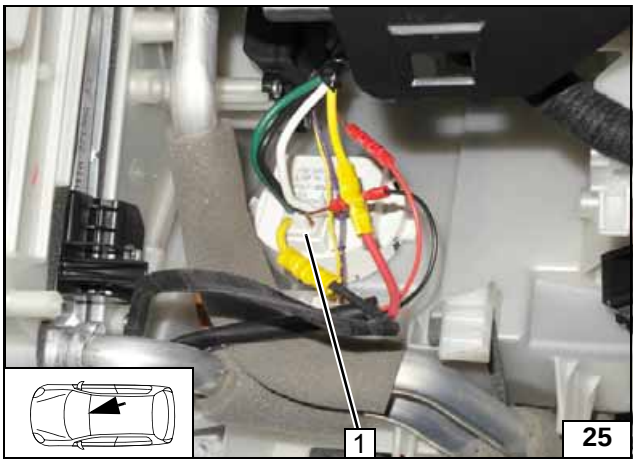
Fan Controller



System wiring diagram for manual air-conditioning (AC) and automatic air-conditioning (ACC)

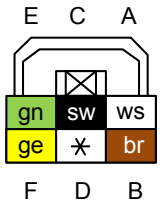
Webasto components		Vehicle components		Colours and symbols	
TT-Evo	TT-Evo heater	F-Heater	40A fuse	rt	red
X1	6-pin heater connector	F- Room	15A fuse	sw	black
X2	2-pin heater connector	GRs	Fan relay	ge	yellow
F1	20A fuse	CCU	A/C control unit	gn	green
F2	30A fuse	GM	Fan motor	br	brown
X10	4-pin connector of heater control	GRr	Fan controller	ws	white
		0740-103	6-pin connector of GRr AAC (2 zones)	bl	blue
F3	1A fuse			lv	lavender
F4	25A fuse	0740-203	6-pin connector of GRr		
K1	Fan relay		AC (7 levels)		
K1	Fan relay				
PWM GW	PWM Gateway				
				*	Automatic air-conditioning (ACC)
PWM GW settings:					
Duty cycle:	65%			**	Manual air-conditioning (AC)
Frequency:	500Hz				
Voltage:	not relevant			X	Cutting point
Function:	Low side			Wiring colours may vary.	

Legend

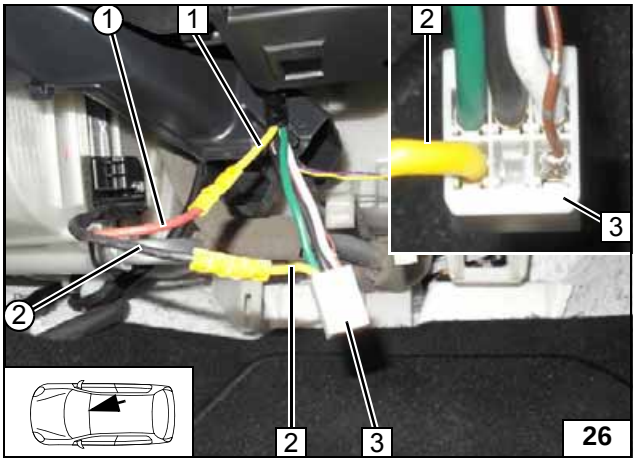


Air duct was removed for improved view.

1 6-pin connector of fan controller
- 0740-103 (ACC dual type)
- 0740-203 (AC 7-speed)



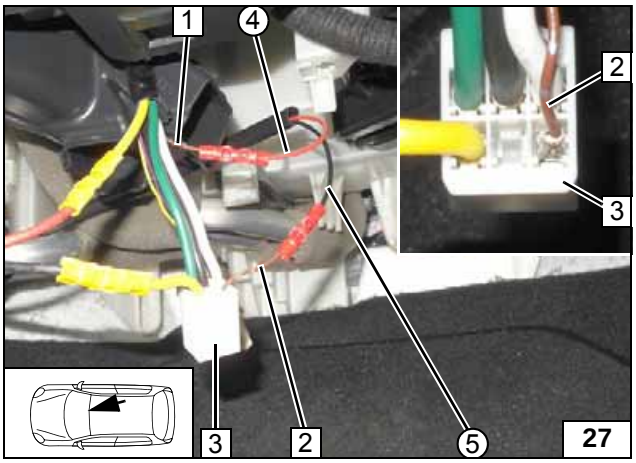
Fan controller connector



Connection to 6-pin connector **3** from fan controller.

1 Yellow (ge) wire of fan relay/ pin C
2 Yellow (ge) wire of 6-pin connector from fan controller/ pin F
① Red (rt) wire of K1/87a, fan wiring harness
② Black (sw) wire of K1/30, fan wiring harness

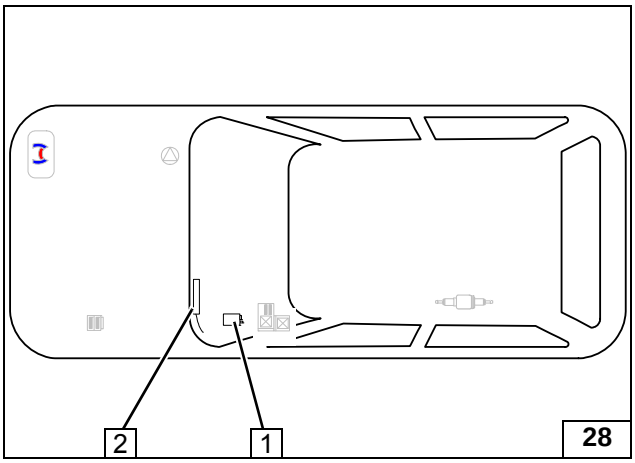
Connection to fan controller



Connection to 6-pin connector **3** from fan controller.

1 Brown (br) wire of A/C control unit pin 1T (ACC) or N (AC)
2 Brown (br) wire from fan controller, pin B
④ Red (rt) wire of PWM GW/IN from PWM control wiring harness
⑤ Black (sw) wire of PWM GW/OUT from PWM control wiring harness

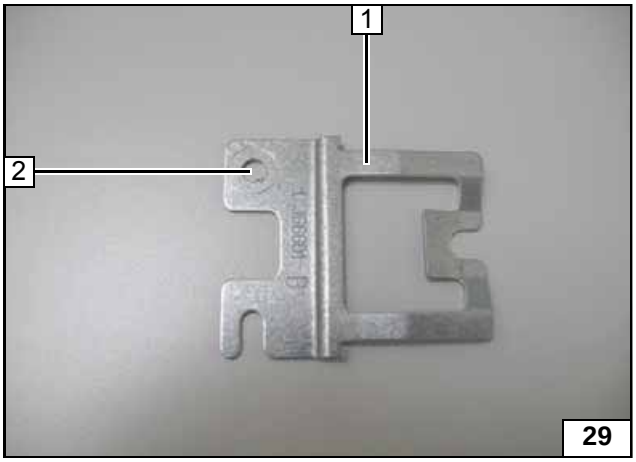
Connection to fan controller



Heater Control Installation

1 Telestart / ThermoCall receiver
2 Telestart / ThermoCall aerial

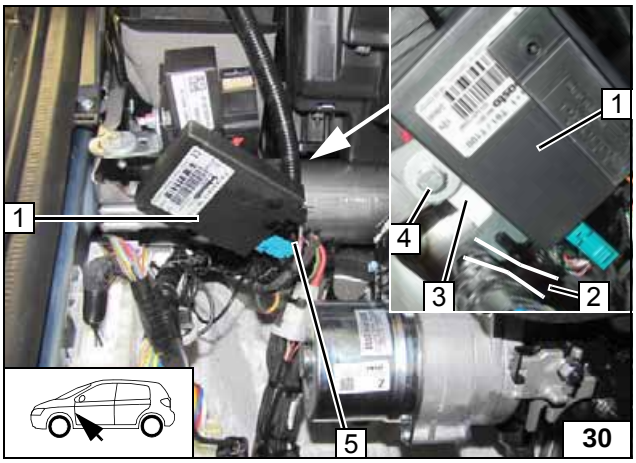
Installation overview



Remote Option (Telestart)

1 Receiver bracket
2 6.5 mm dia. hole

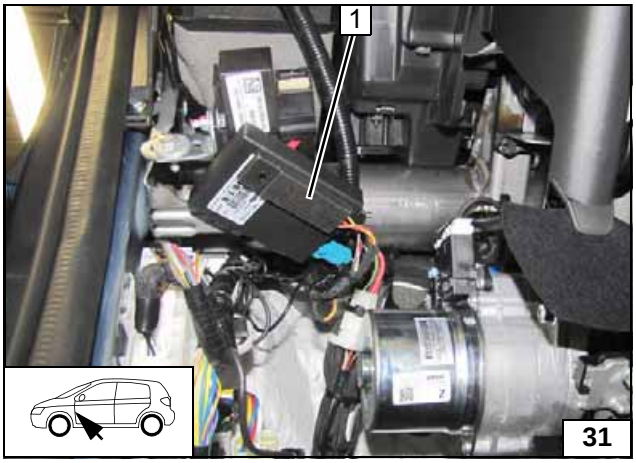
Preparing bracket



Ensure sufficient distance (at least 20mm) between bracket and original vehicle wiring harness at position **2**, correct if necessary!
Route Telestart wiring harness and aerial wire **5** in a loop downwards!

1 Receiver mounted
3 Bracket
4 Original vehicle bolt (8-10Nm)

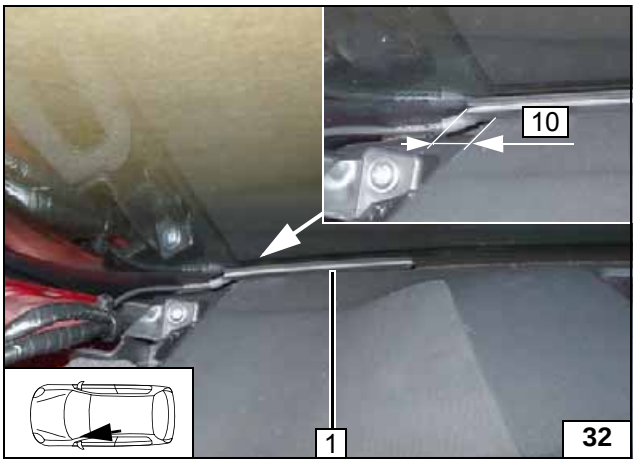
Installing receiver



Temperature sensor T100 HTM

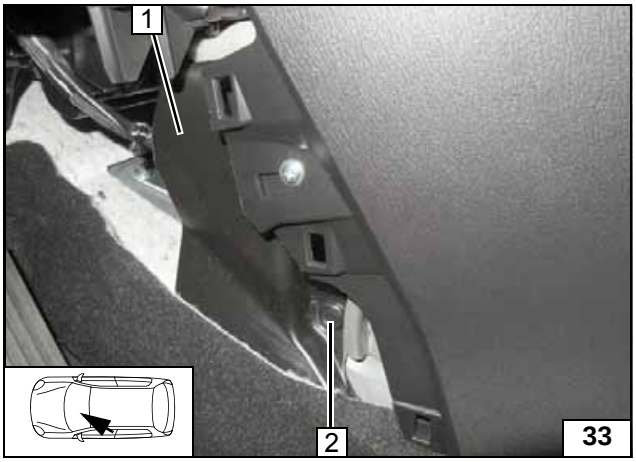
Fasten temperature sensor **1** with double-sided adhesive tape.

Installing temperature sensor



1 Aerial

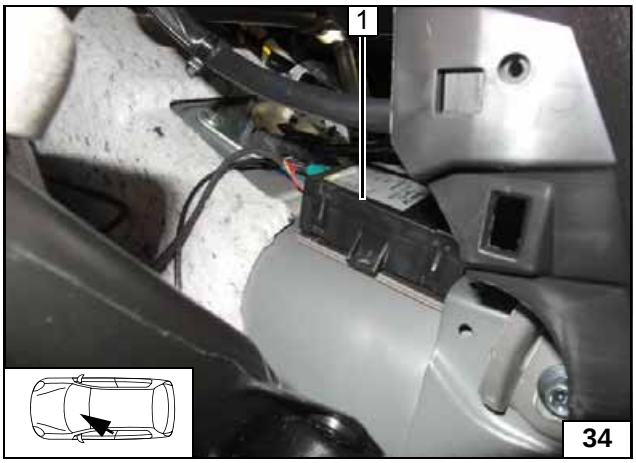
Installing aerial



ThermoCall Option

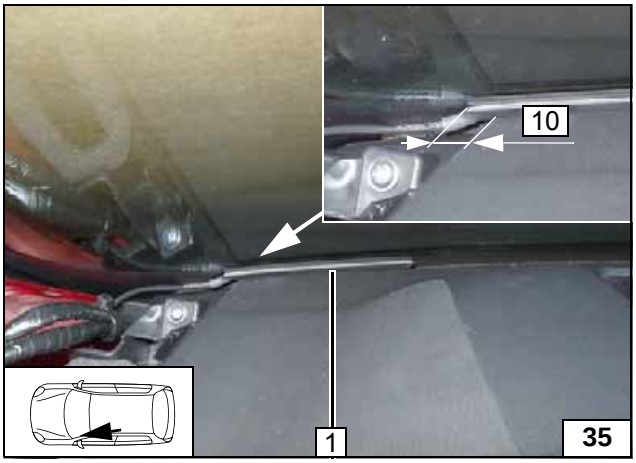
1 Detach air shaft
2 Retaining clip

Detaching air shaft



Fasten receiver **1** with double-sided adhesive tape.

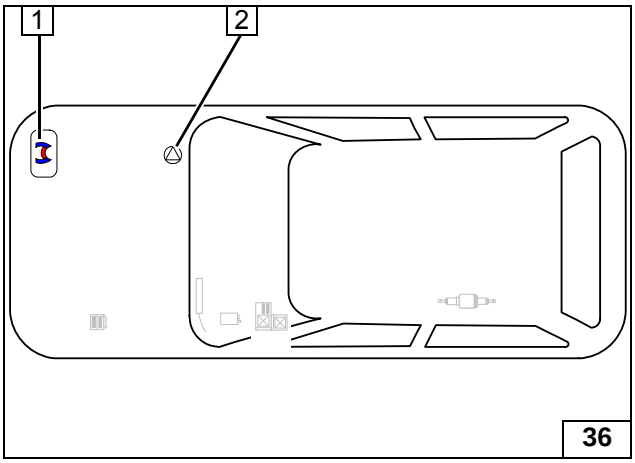
Installing receiver



1 Aerial (optional)

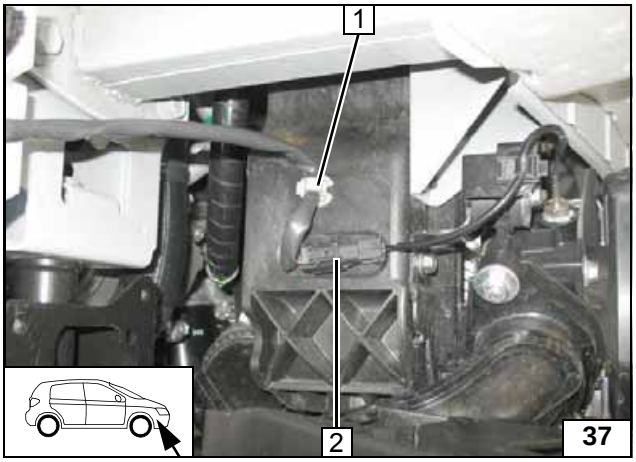
Installing aerial

Preparation of the Installation Location



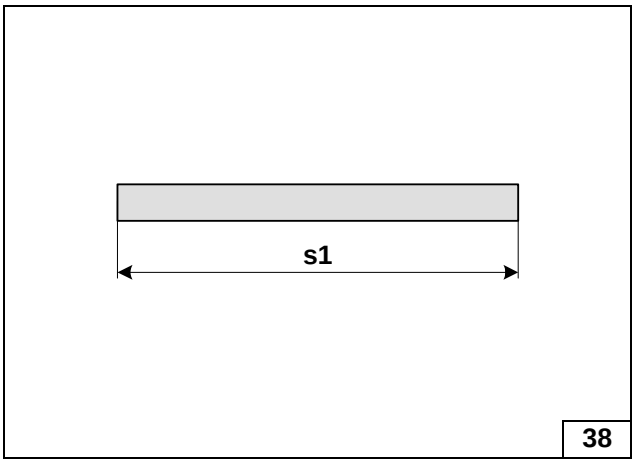
1 Heater
2 Circulating pump

Installation overview



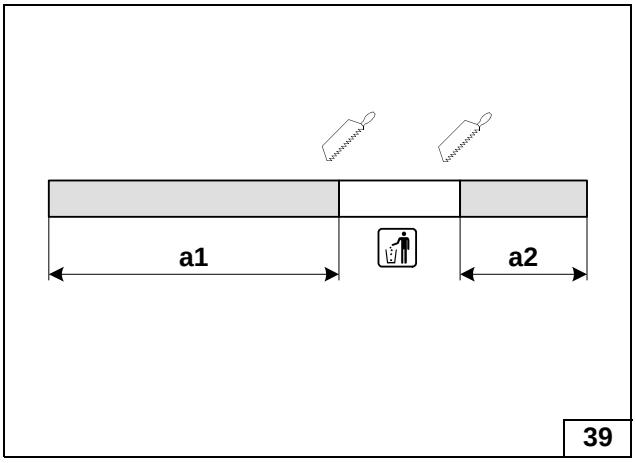
Detach eyelet cable tie **1** and original vehicle connector **2**, these will be connected to the combustion air pipe later on.

Detaching connector



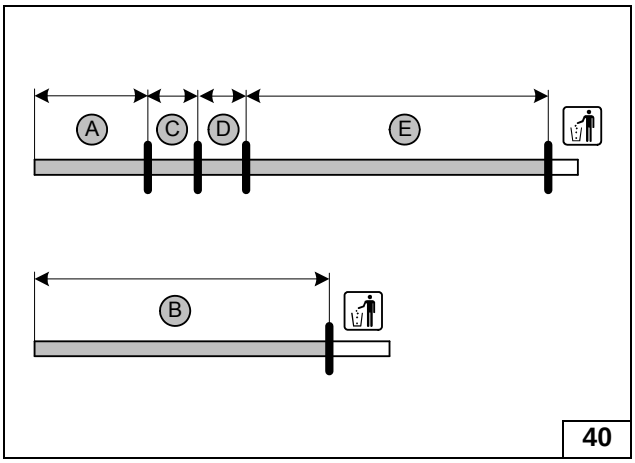
s1 = 315

Assigning combustion air pipe



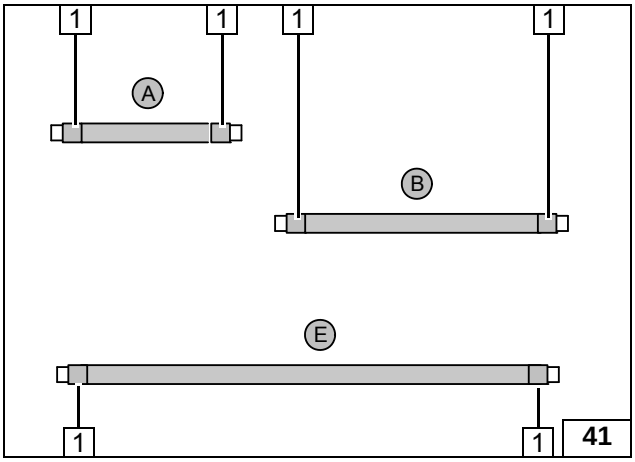
a1 = 150
a2 = 140

Preparing exhaust pipe



A	370
B	900
C	120
D	120
E	1250

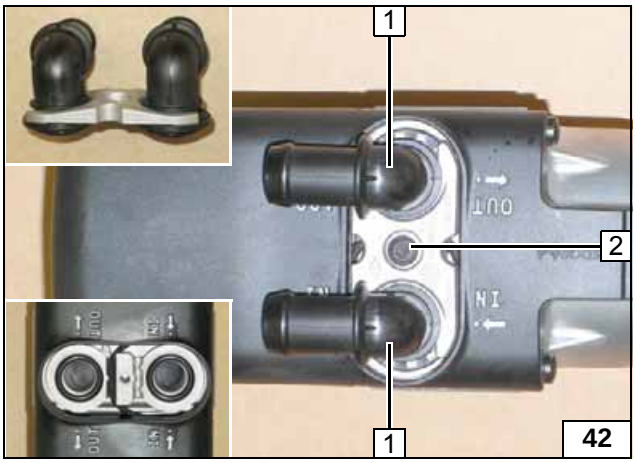
Cutting hoses to length



Push braided protection hoses onto hoses **A** and **B** and cut to length.
Slide braided protection hose onto **E**. Cut heat shrink plastic tubing to length.

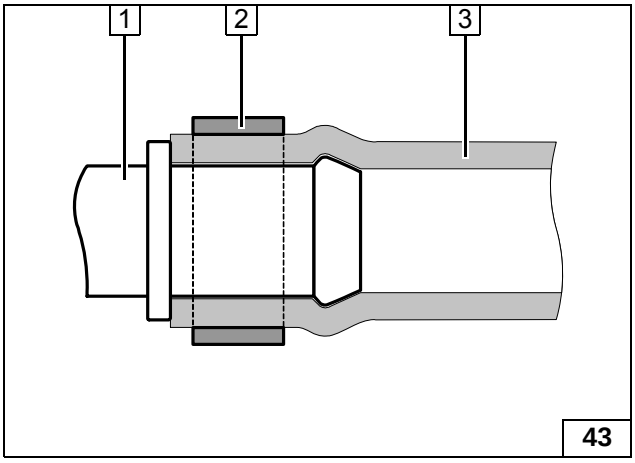
1 40 mm long heat shrink plastic tubing [6x]

Preparing hoses



1 Water connection piece, sealing ring [2x each]
2 5x15 self-tapping bolt, retaining plate of water connection piece (7Nm)

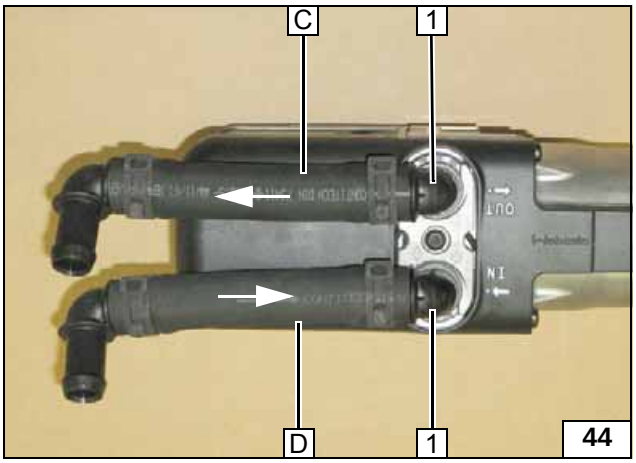
Installing water connection piece



General assembly of connecting pipe, hose and spring clip.

1 Connecting pipe
2 Spring clip
3 Hose

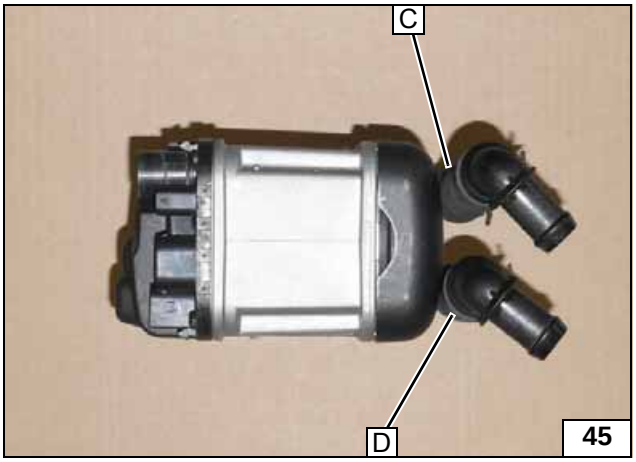
Note on hoses installation



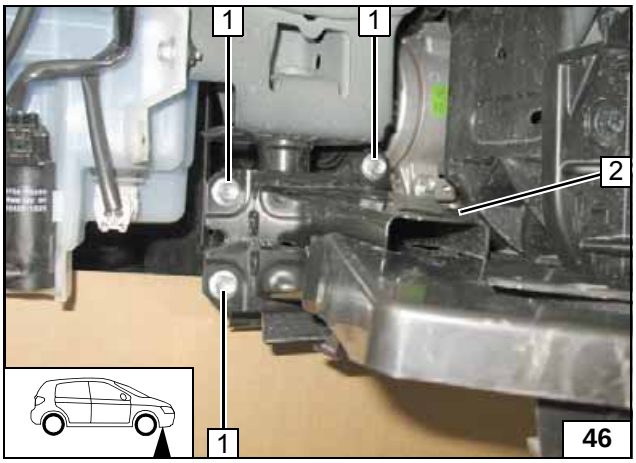
All spring clips of 25mm dia. [4x]

1 Align 90°, 18x18 dia. connecting pipe [2x] as shown in next figure.

Premounting hoses



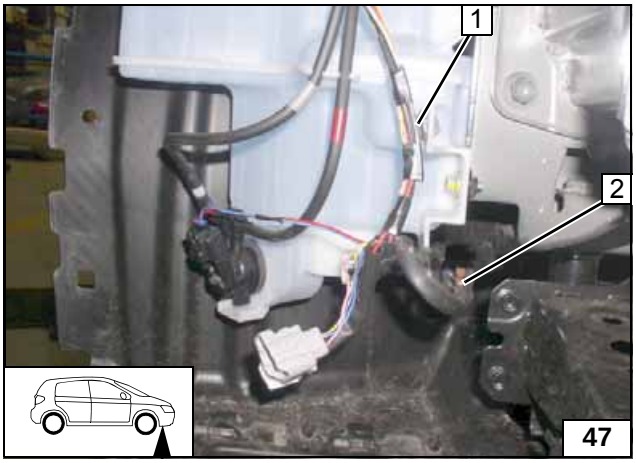
Aligning connecting pipes



Remove original vehicle bolts at position **1** [3x], will be reused.

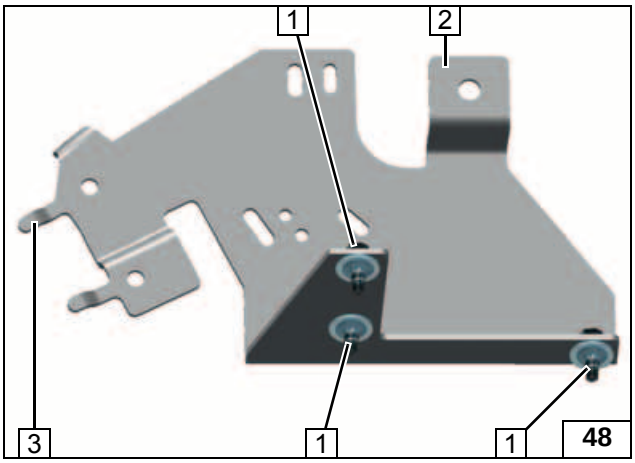
2 Bumper mounting bracket carrier

Removing bolts



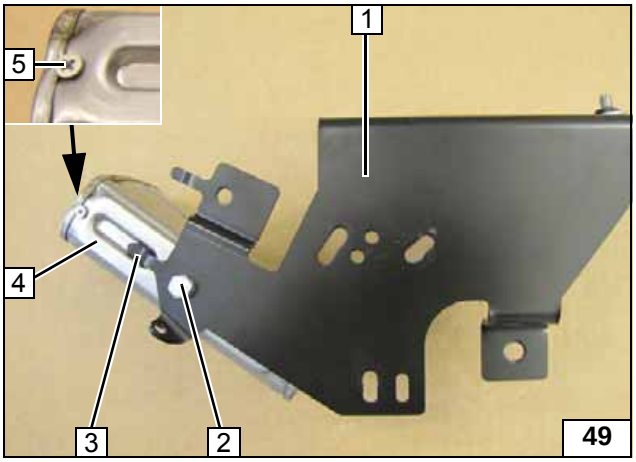
Detach **1** retaining clip.
Detach dummy plug **2** (only in case of vehicle without headlight washer system).

Detaching wiring harness and connector



1 Original vehicle bolt, large diameter washer, lock washer [3x each]
2 Bracket
3 Locking tab for exhaust silencer

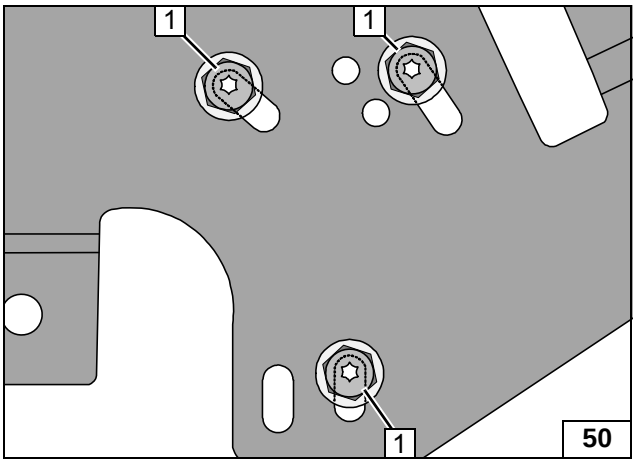
Premounting bracket



Screw 3x9 self-tapping screw in existing condensate hole **5**.

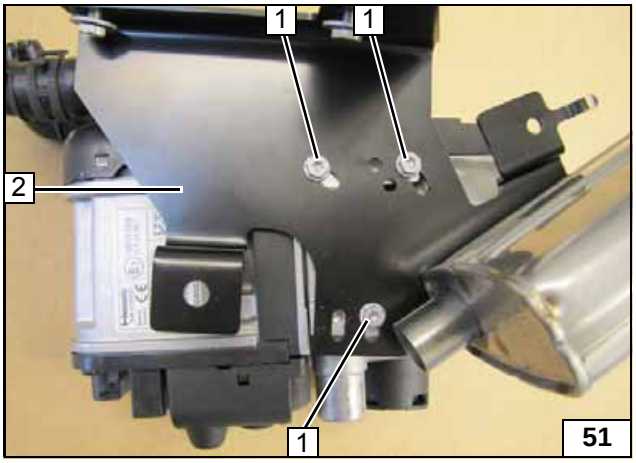
1 Bracket
2 M6x16 bolt, loosely mount spring lockwasher
3 Locking tab
4 Exhaust silencer

Premounting exhaust silencer



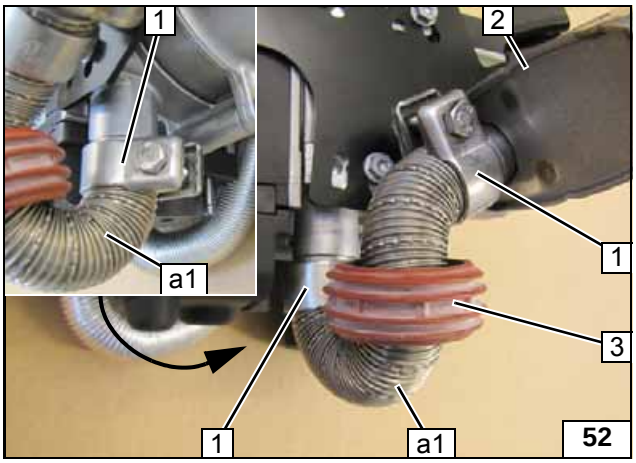
1 5x13 self-tapping bolt [3x]

View of the heater bolts on the bracket



1 5x13 self-tapping bolt [3x] (7Nm)
2 Bracket

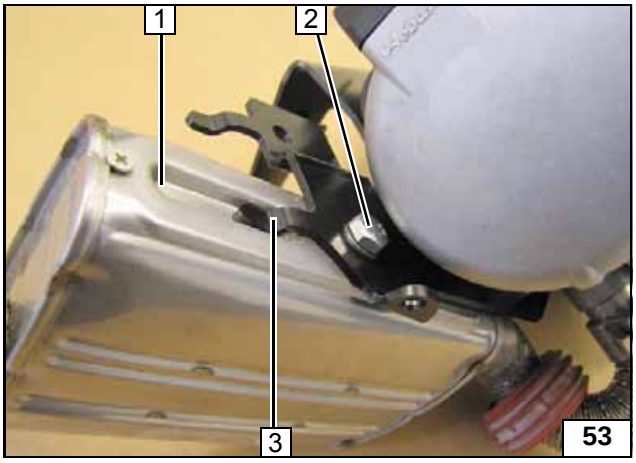
Installing bracket of heater



Align exhaust silencer **2**, see next figure.

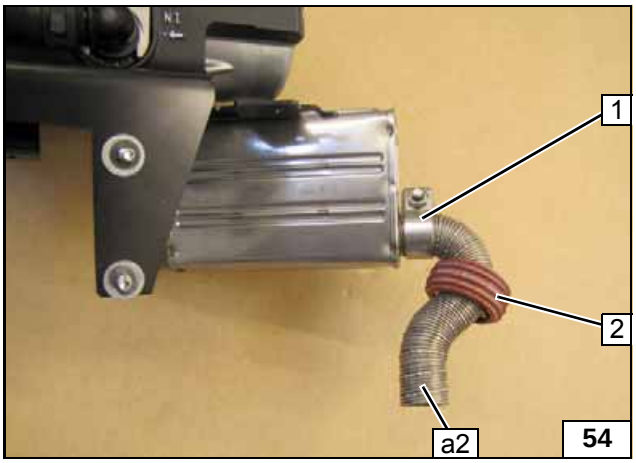
1 Hose clamp [2x]
3 Slide on spacer bracket and align

Installing exhaust pipe a1



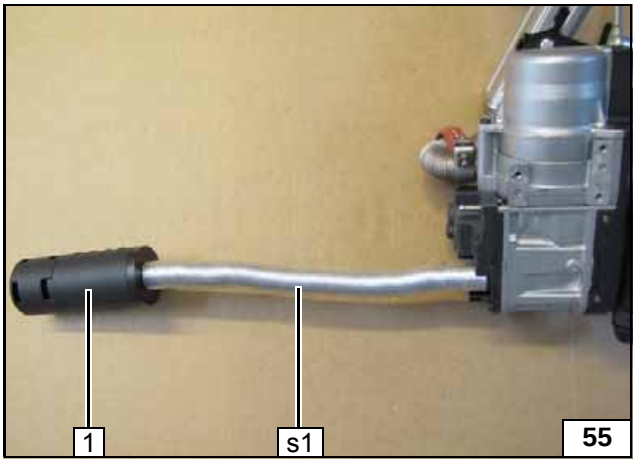
Align exhaust silencer **1** with locking tab **3** and tighten bolt **2**.

Installing silencer



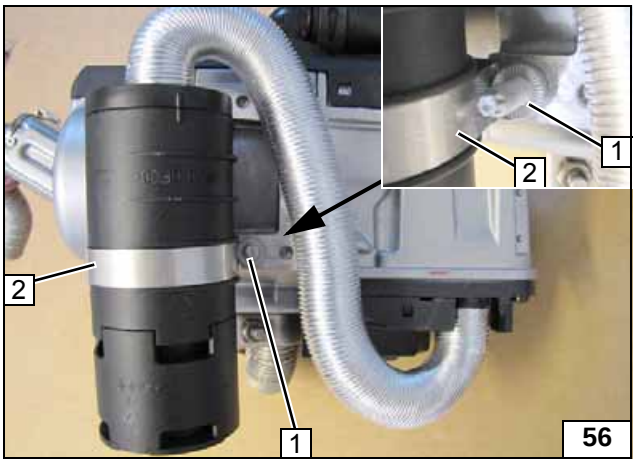
1 Hose clamp
2 Slide on spacer bracket and align

Premounting exhaust pipe a2



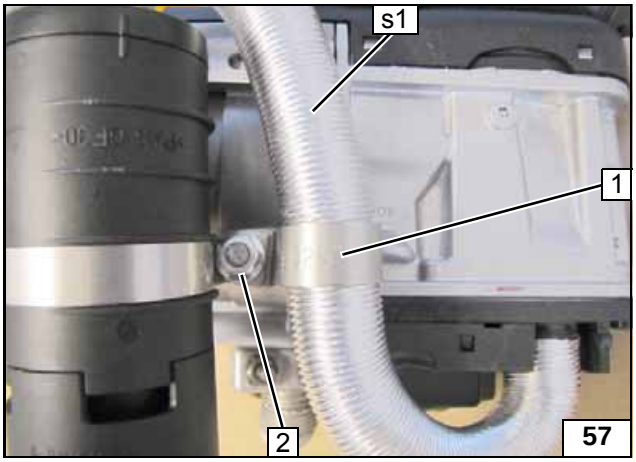
1 Combustion-air intake silencer

Premounting combustion-air intake silencer and line



1 M5/6x14.5 self-tapping stud bolt
2 51mm dia. clamp

Securing combustion air silencer

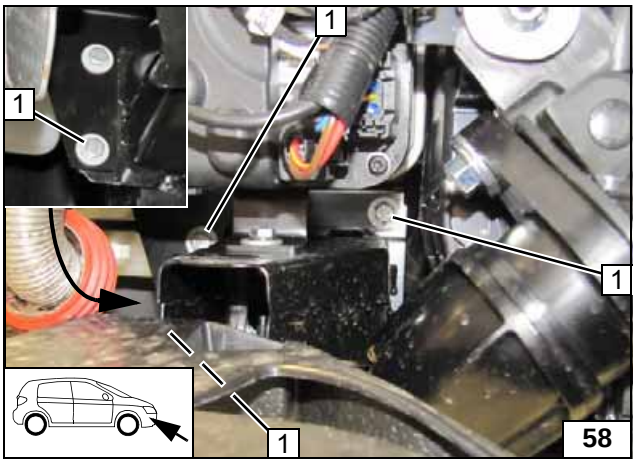


1 P-clamp on premounted stud bolt
2 Flanged nut

Securing combustion air pipe s1

Installation of the Heater

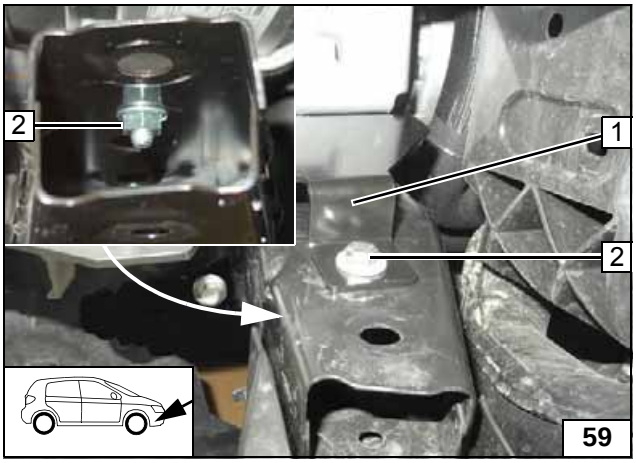
Fuel line as well as heater and circulating pump wiring harness will be installed later.



1 Premounted bolt, existing threaded hole [3x each] (8-10Nm)

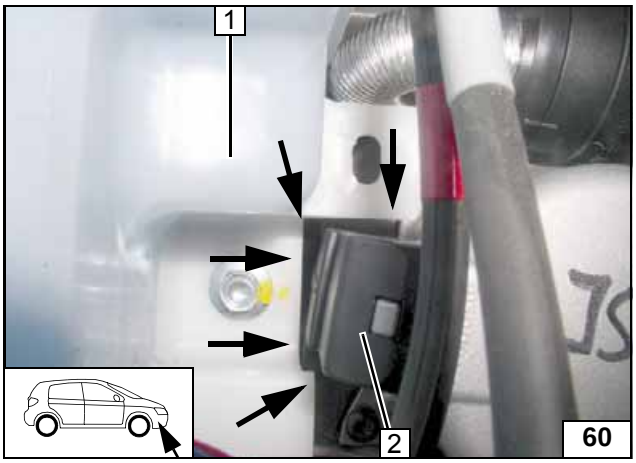
Installing heater

Align heater as shown in the next figures.

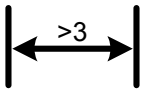


1 Heater bracket
2 M6x20 bolt, large diameter washer, existing hole, spring lockwasher, nut (8-10Nm)

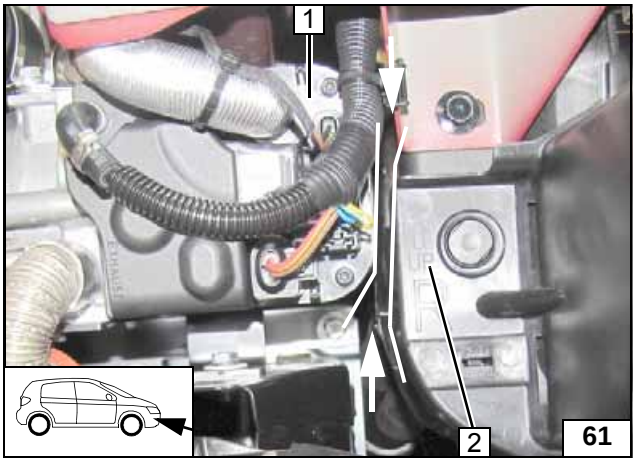
Installing bracket



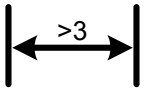
1 Washer reservoir
2 Heater



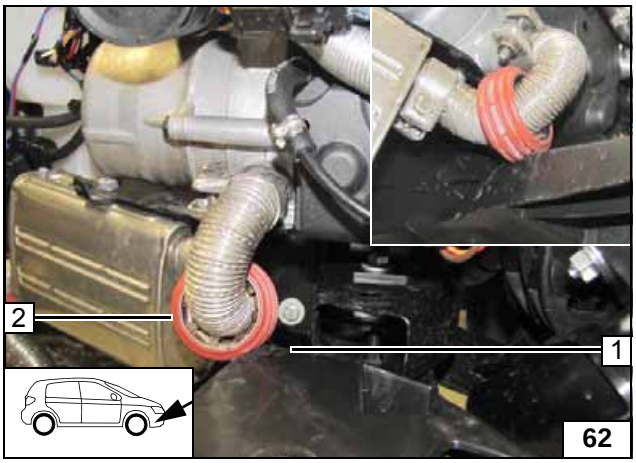
Installing heater



1 Heater
2 Radiator housing

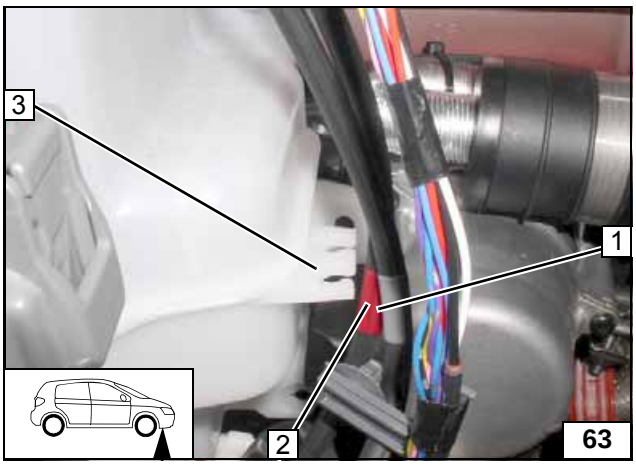


Installing heater



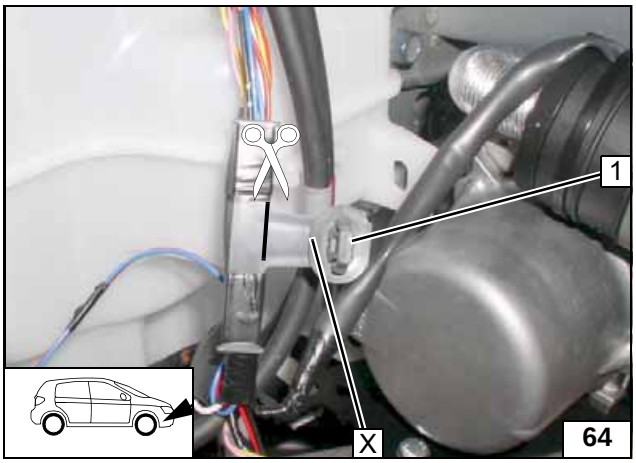
Align spacer bracket **2** with bumper bracket **1**.

Aligning spacer bracket



Detach original vehicle lines **1** and **2** from bracket **3**.

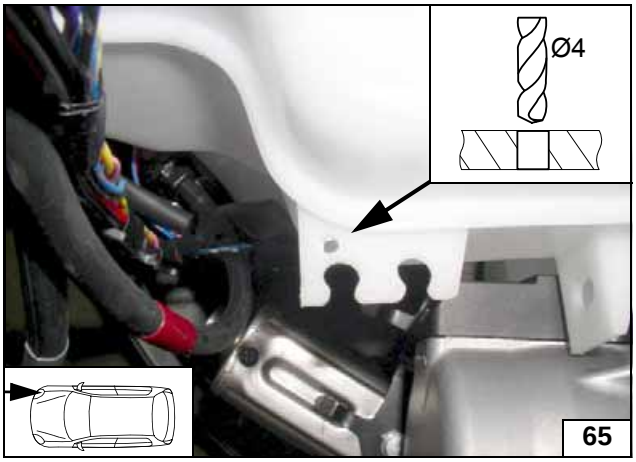
Detaching lines



Shorten retaining clip **1** as shown.

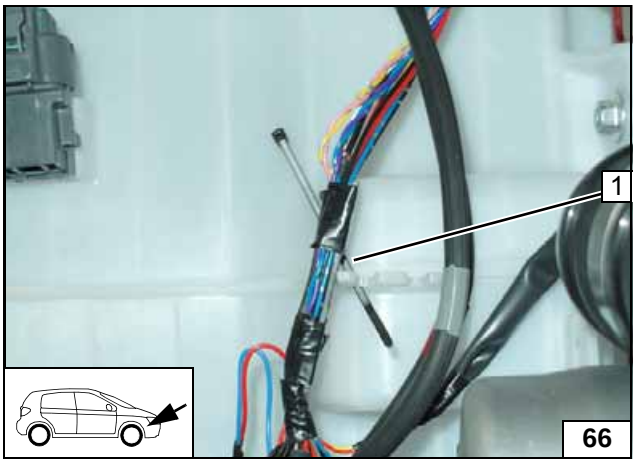
X =

Removing clip



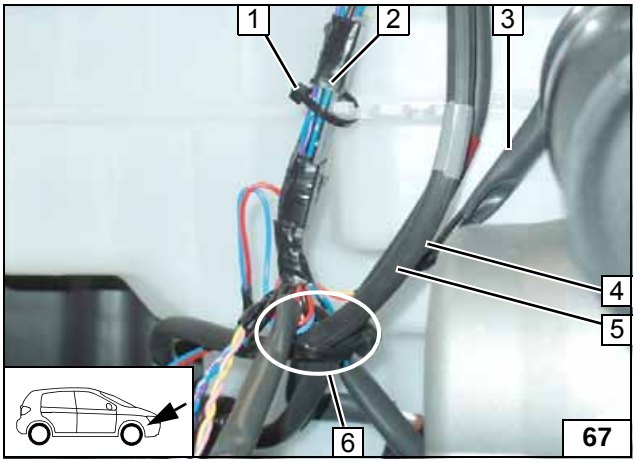
Drill hole in washer reservoir tab as shown.

Drilling hole



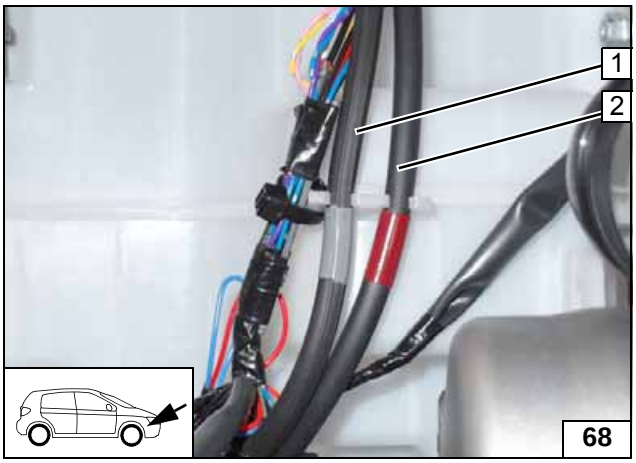
1 Thin cable tie through hole

Inserting cable tie



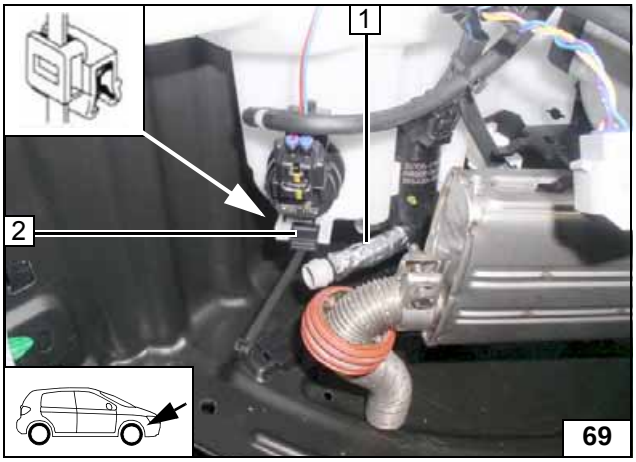
Route original vehicle wiring harness **3** behind lines **4** and **5**.
Secure original vehicle wiring harness **2** at the adapted retaining clip level using cable tie **1**.
Tie original vehicle lines loosely together using cable tie **6** as shown.

Attaching lines



Snap lines **1** and **2** into place.

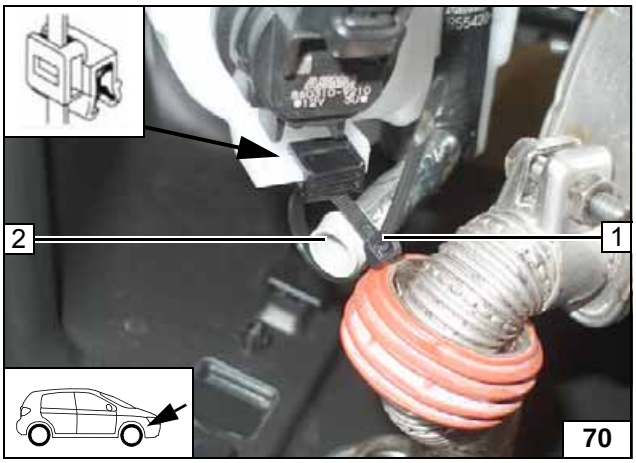
Attaching lines



Stick heat protection film **1** around the hose connection pieces of the headlight washer system pump.

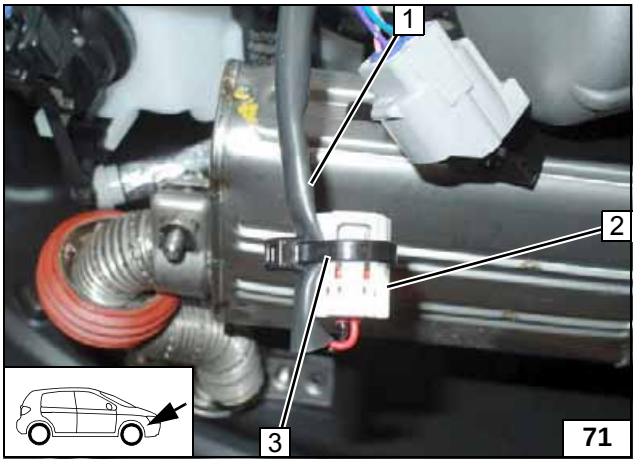
2 Clip-type cable tie

Installing clip-type cable tie



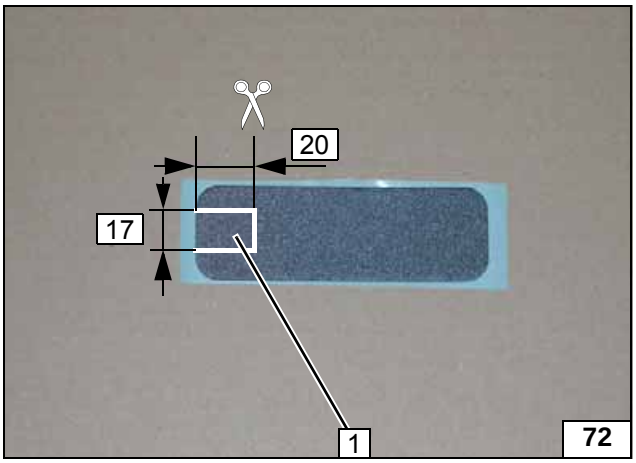
Install cable tie **1** around hose connection piece **2** but do not close it!

Premounting cable tie



Attach original vehicle wiring harness **1**, using cable tie **3**, to white connector **2** of front fog light as shown.

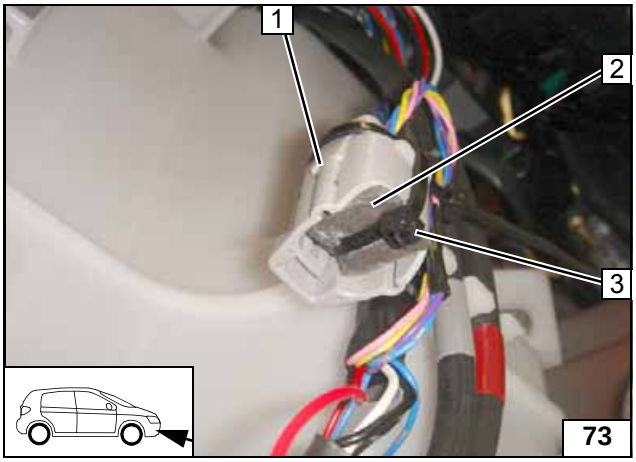
Attaching lines



Vehicle without parking assistance

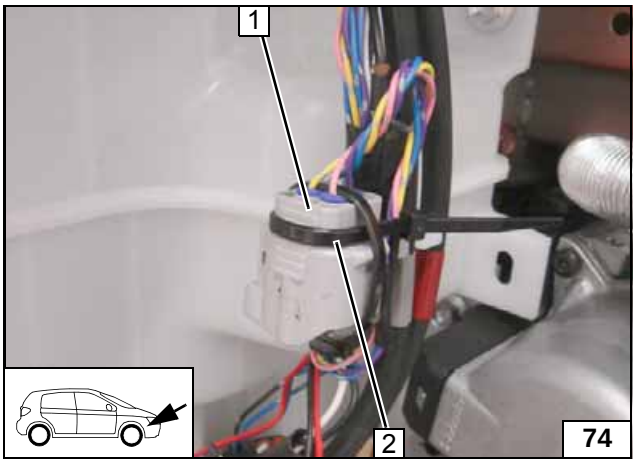
Cut section **1** out of self-adhesive foam as shown.

Preparing self-adhesive foam



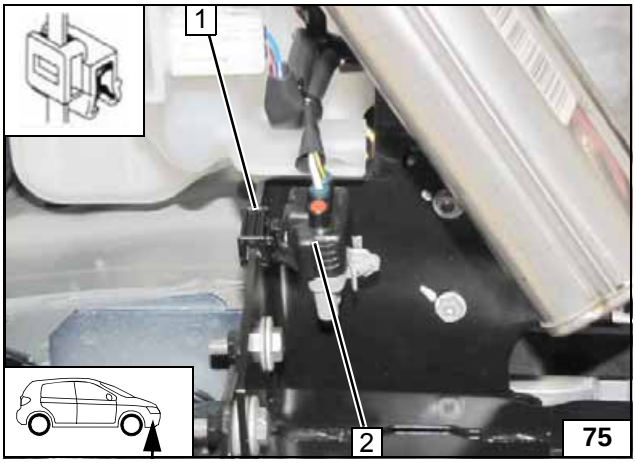
Position section of self-adhesive foam **2** onto parking assistance connector **1** and secure using cable tie **3**.

Preparing connector



Attach parking assistance connector **1**, using cable tie**2** , to original vehicle wiring harness as shown.

Attaching lines



Vehicles without headlight washer system

Attach headlight washer system dummy plug **2**, using clip-type cable tie **1** , to heater bracket as shown.

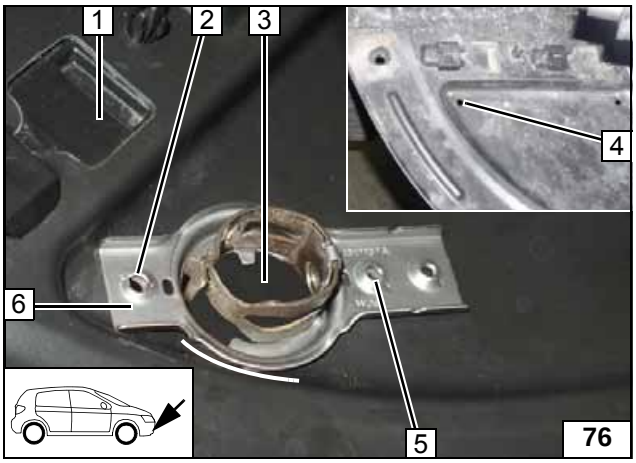
Attaching lines

Installing exhaust end fastener

All vehicles

Work steps 1 and 3.

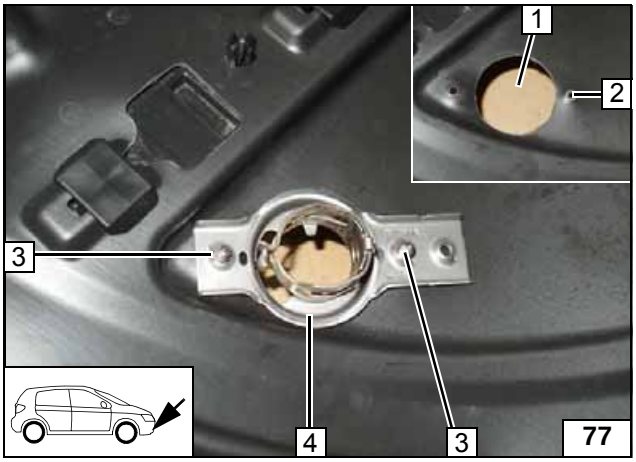
Position exhaust end fastener **6** so that threaded hole **2** is exactly aligned with hole **4** and with the edge of the wheel-well inner panel as shown.



3 Hole pattern for 43mm dia. hole
5 Hole pattern for 5mm dia. hole

Copying hole pattern

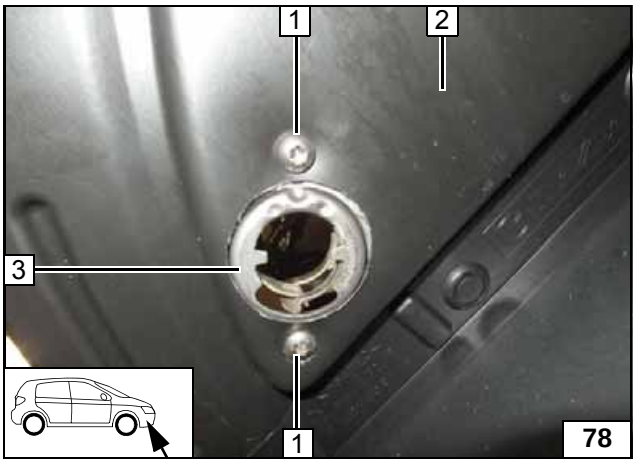
Work steps 3 to 5.



1 43 mm dia. hole
2 5mm dia. hole
3 5x13 self-tapping screw [2x]
4 Exhaust end fastener

Drilling holes and installing exhaust end fastener

Bumper and wheel well trim will be installed later.



1 5x13 self-tapping screw [2x]
2 Wheel well trim on the right side
3 Exhaust end fastener

View of exhaust end fastener from below

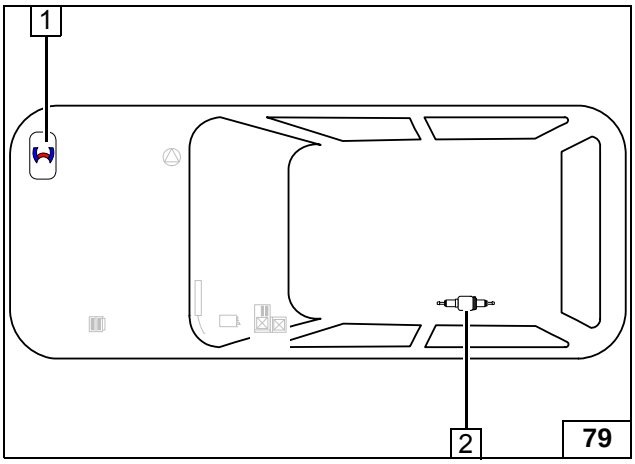
Fuel

CAUTION!
Open the vehicle's fuel tank cap, ventilate the tank and then re-close the tank lock.

Catch any fuel running off in an appropriate container.

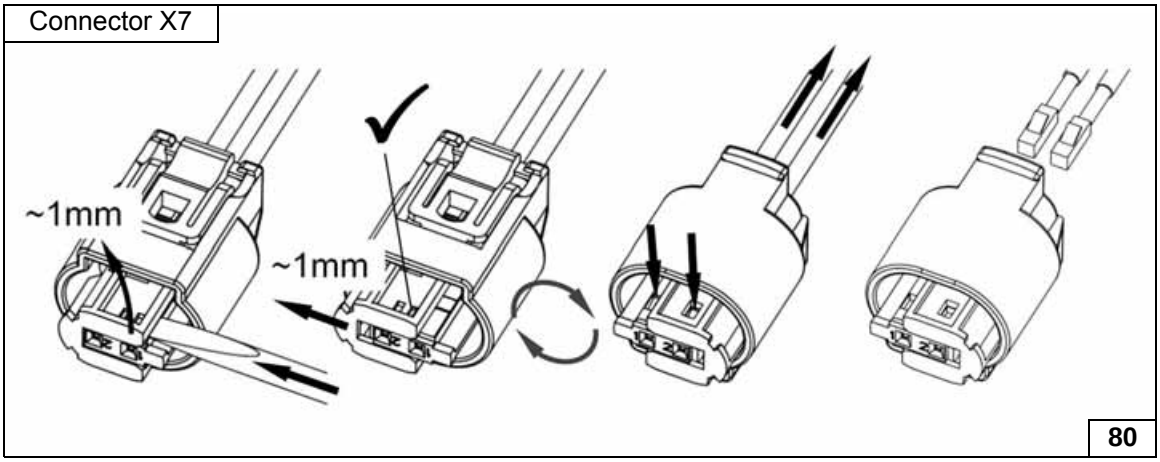
Route fuel line and metering pump wiring harness so that they are protected against stone impact.
Unless specified otherwise, always fasten using cable ties.
Provide rub protection for fuel line and wiring harness in areas where there are sharp edges.

The fuel line and wiring harness are routed to the metering pump as shown in the wiring harness routing diagram.

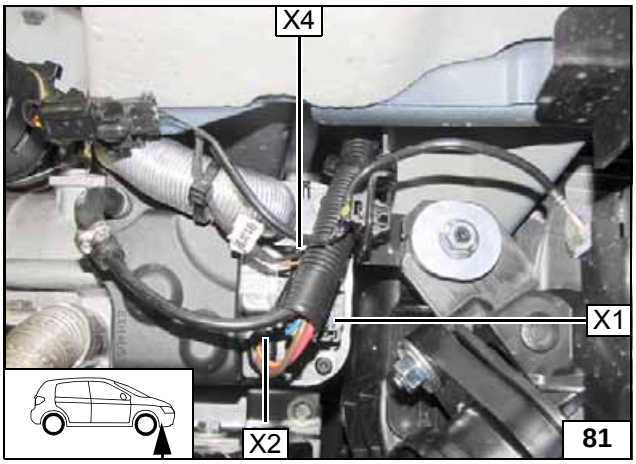


1 Heater
2 Metering pump

Installation overview



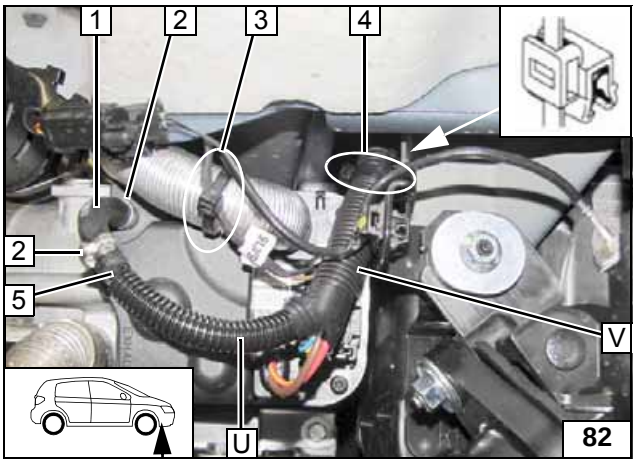
Dismantling metering pump connector



Fuel line will be installed later.

X1 6-pin connector of heater wiring harness
X2 2-pin connector of heater wiring harness
X4 Connector of circulating pump wiring harness

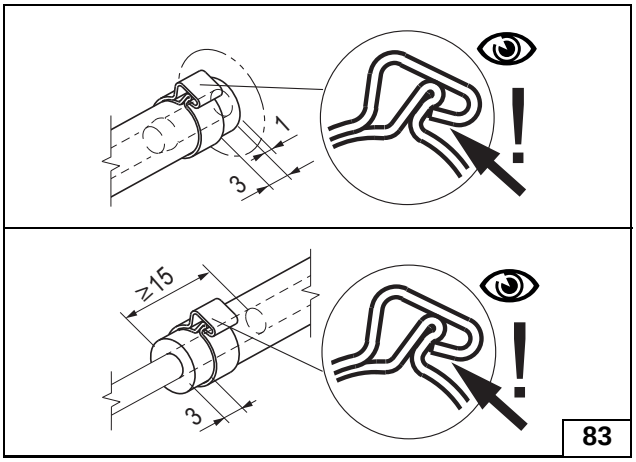
Installing wiring harnesses



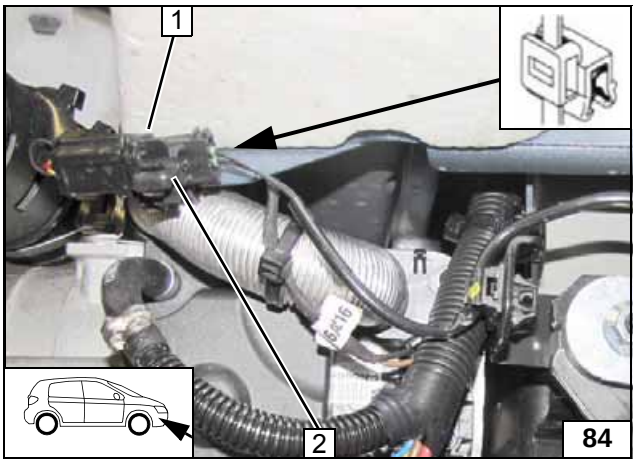
For the installation of the fuel line and clamps, see figure below.
Draw fuel line **5** into corrugated tube **U**.
Draw fuel line and metering pump wiring harness into 10mm dia. corrugated tube **V** and route in the engine compartment.

1 90° moulded hose
2 10 mm dia. clamp [2x]
3 Cable tie for circulating pump wiring harness
4 Clip-type cable tie

Installing fuel line

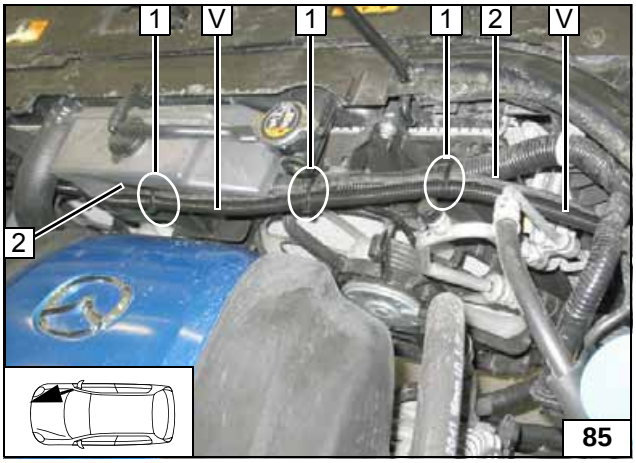


Installing fuel line and clamps



1 Cable tie
2 Original vehicle connector

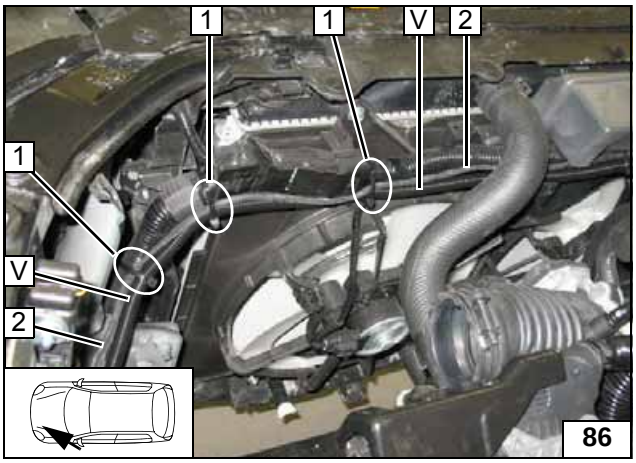
Fastening connector and wiring harness



Route 10mm dia. corrugated tube **V** along heater wiring harness **2** and the original vehicle wiring harness to the left side of the vehicle.

1 Cable tie [3x]

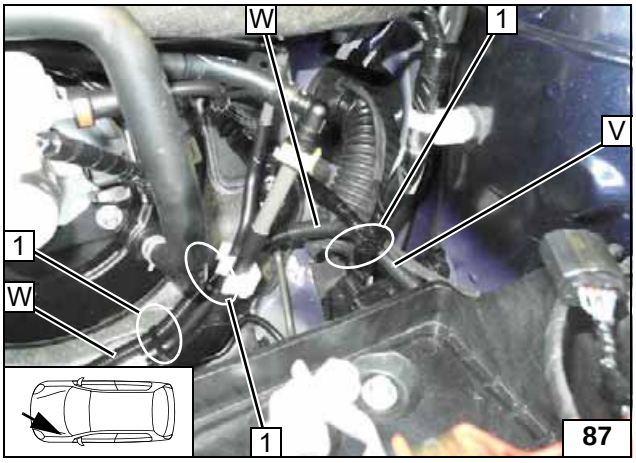
Routing lines



Route 10mm dia. corrugated tube **V** along heater wiring harness **2** and the original vehicle wiring harness on the frame side member to the firewall.

1 Cable tie [3x]

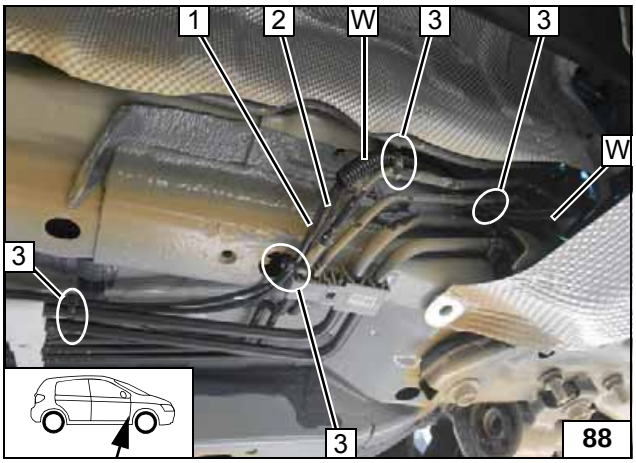
Routing lines



Pull fuel line and metering pump wiring harness into 10mm dia. corrugated tube **W** and route along the firewall to the underbody.

1 Cable tie [3x]

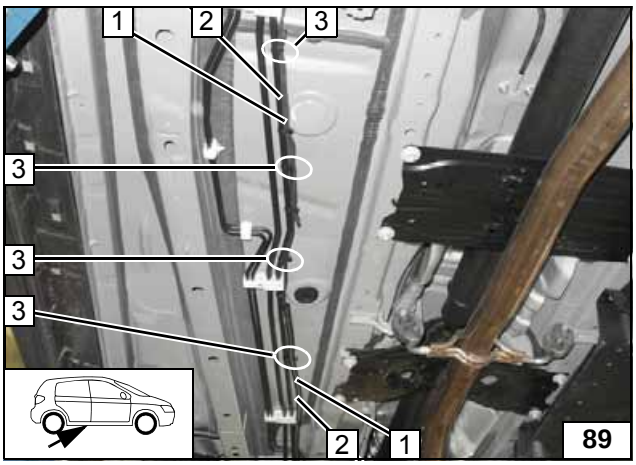
Routing lines



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

3 Cable tie [4x]

Routing lines

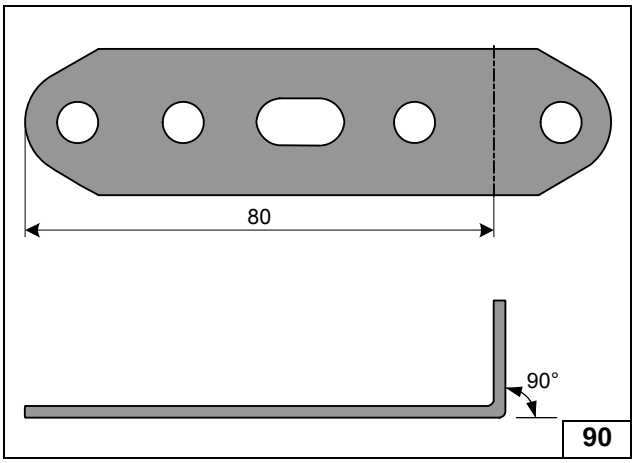


Route fuel line **1** and metering pump wiring harness **2** along original vehicle fuel lines to the installation location of the metering pump.

3 Cable tie [4x]

Routing lines

Angling down perforated bracket



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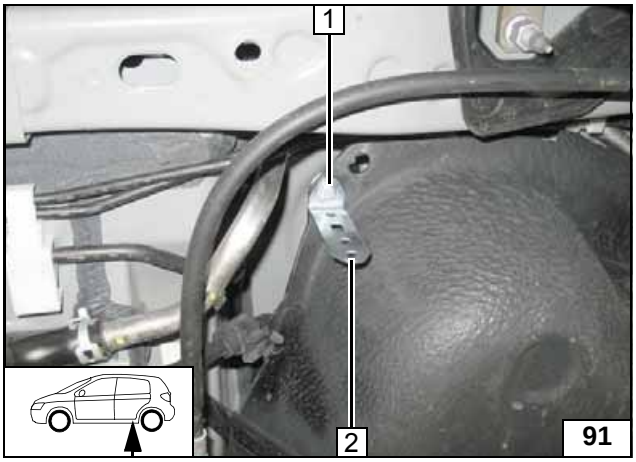
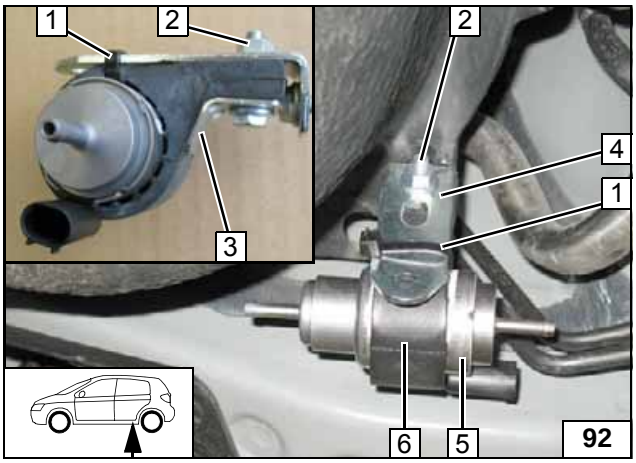
Installing perforated bracket



91

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

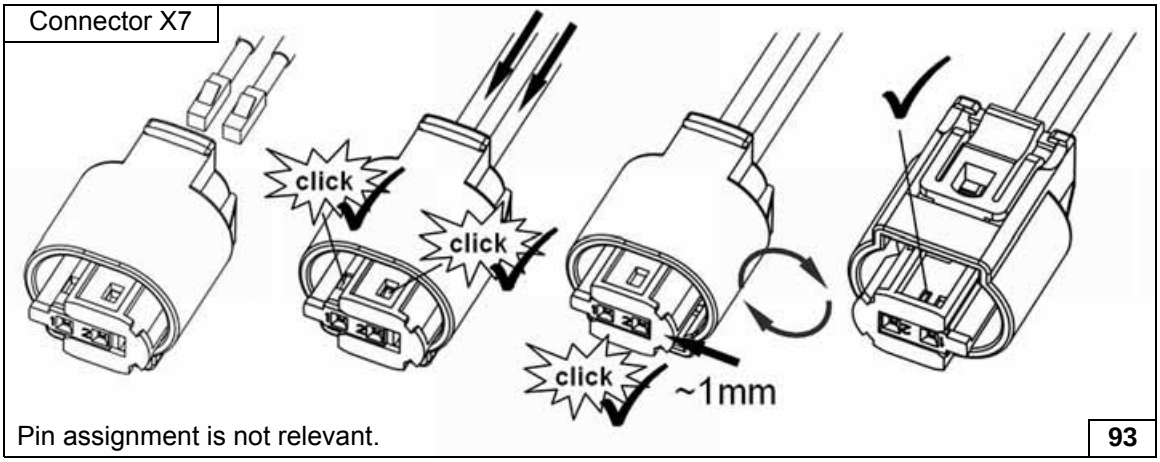
Installing metering pump



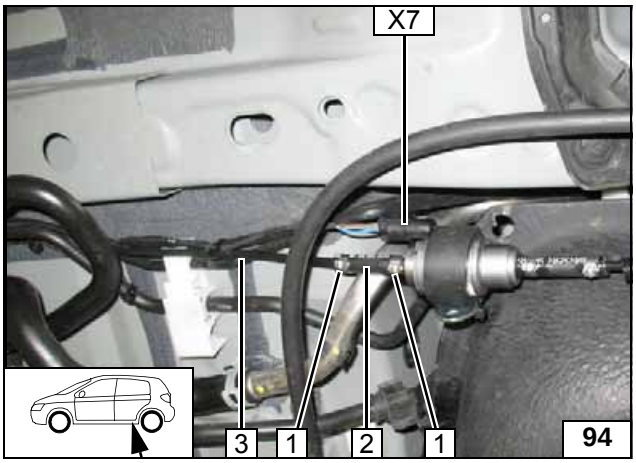
92

1 Cable tie
2 M6x25 bolt, flanged nut
3 Support angle bracket
4 Perforated bracket
5 Metering pump
6 Metering pump mount

Completing metering pump connector

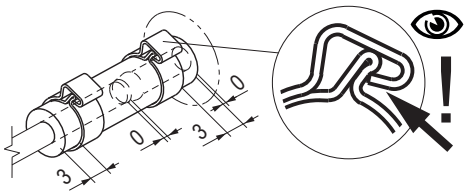


93

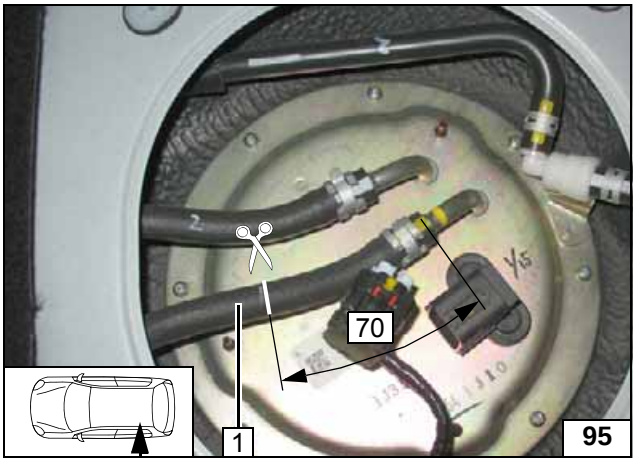


Cut heater fuel line to length.

1 10 mm dia. clamp [2x]
2 Hose section
3 Fuel line of heater
X7 Connector of metering pump wiring harness

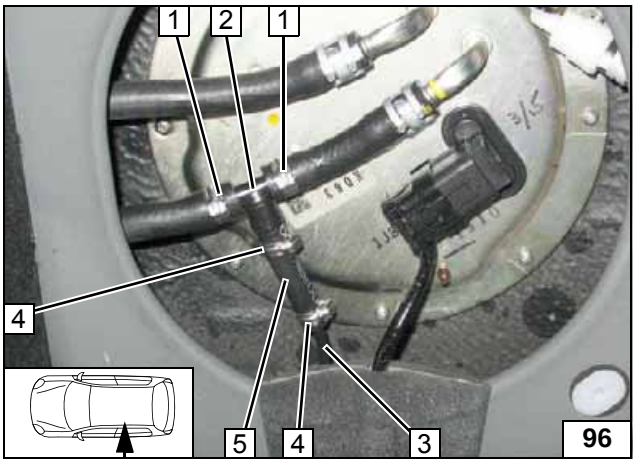


Connecting metering pump



Cut fuel supply line **1**.

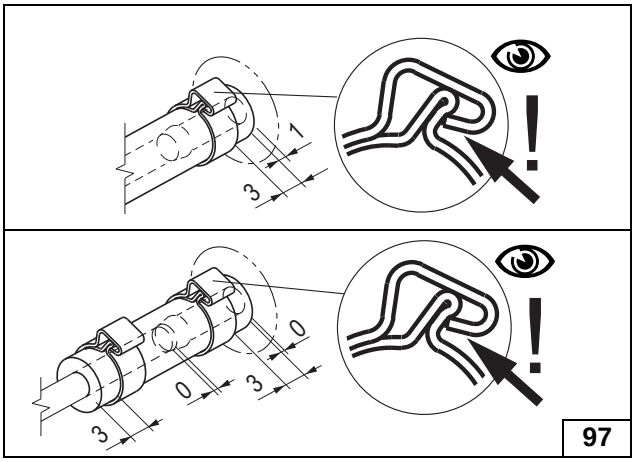
Fuel extraction



For the installation of the fuel line and clamps, see figure below.

1 13.5mm dia. clamp [2x]
2 8x5x8 fuel standpipe (T-piece)
3 Fuel line
4 10 mm dia. clamp [2x]
5 Hose section

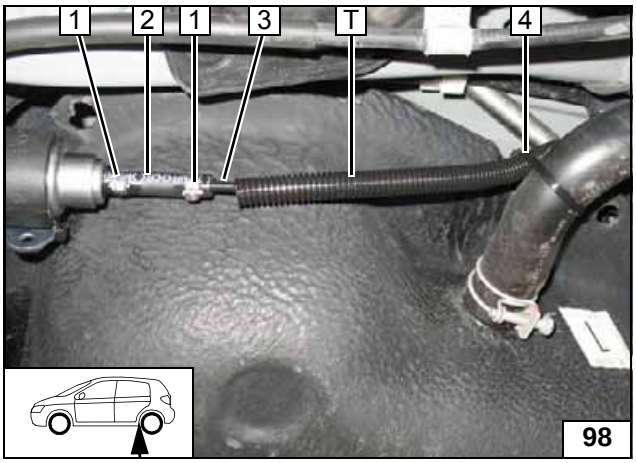
Installing fuel standpipe

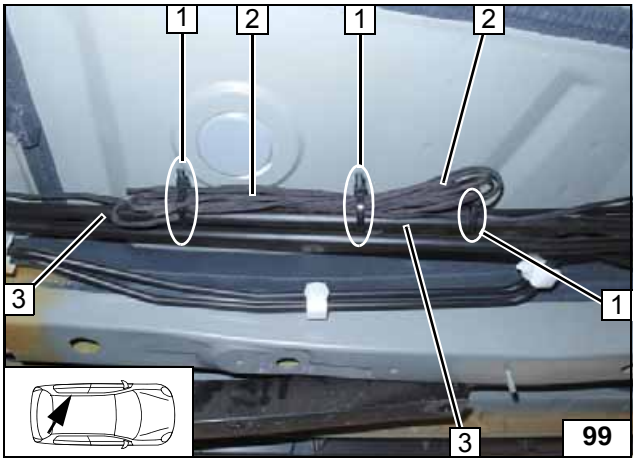


13.5mm dia. clamp

10mm dia. clamp

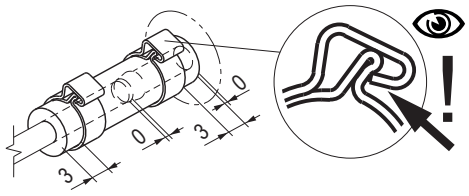
Connecting fuel line and clamps





Insert fuel line **3** into 10mm dia. corrugated tube **T**.
Ensure sufficient distance from neighbouring components, correct if necessary.

1 10 mm dia. clamp [2x]
2 Hose section
4 Cable tie



Attach excess length **2** to original vehicle fuel lines **3**.

1 Cable tie [3x]

Connecting metering pump

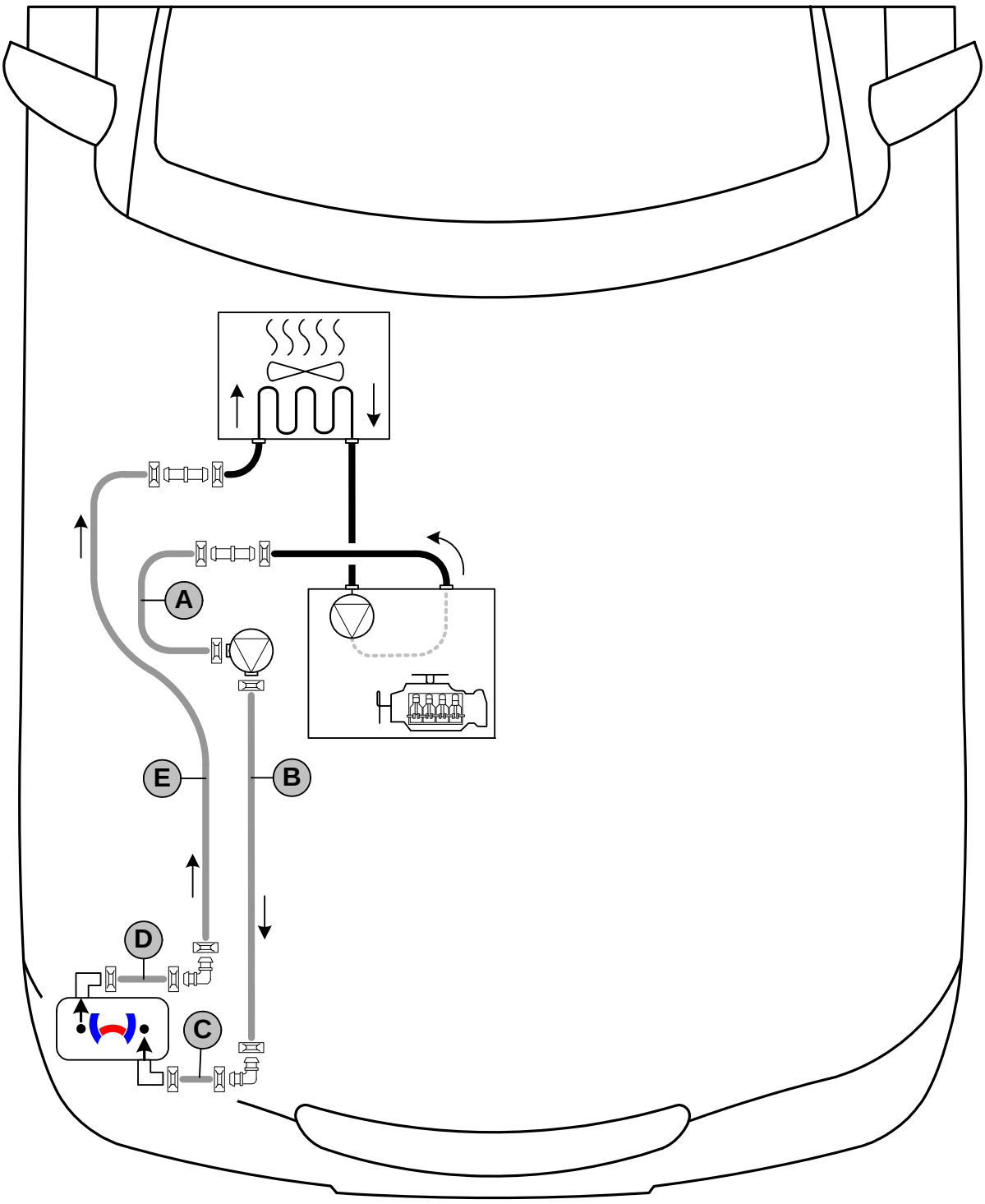
Routing lines

Coolant Circuit

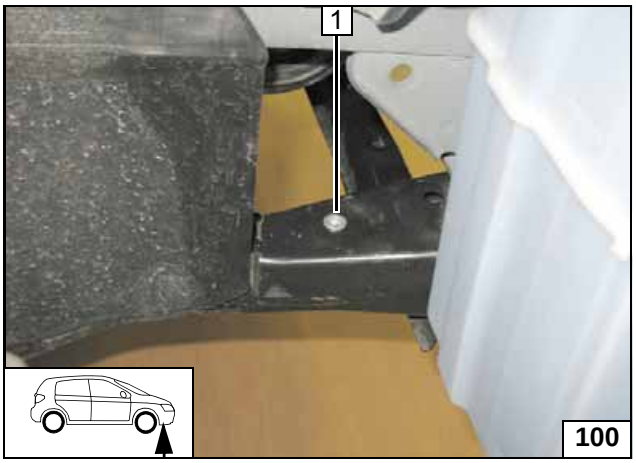
Any coolant running off should be collected in an appropriate container. Route hoses kink-free. Unless specified otherwise, always fasten using cable ties. Position clamps so that other hoses cannot be damaged. The heater must be filled with coolant when installing the hoses.

The connection should be modelled on an ‘inline’ circuit and based on the following diagram:

Hose routing diagram



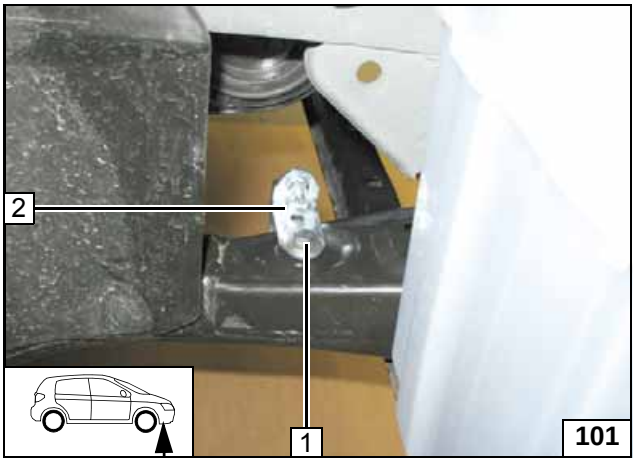
All spring clips = 25 mm dia. All connecting pipes and = 18x18 mm dia.



All vehicles

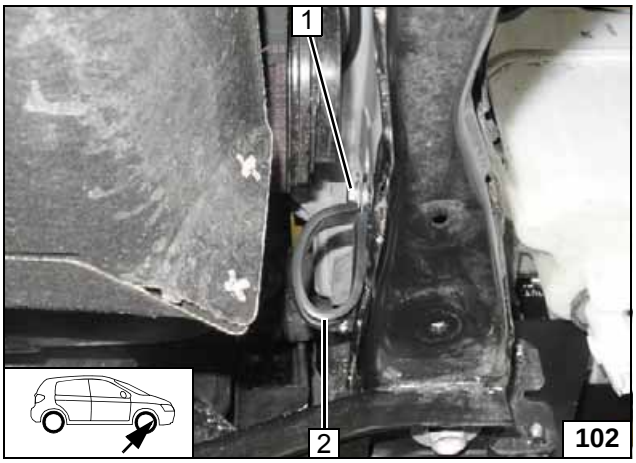
1 Rivet nut, existing hole

Installing rivet nut



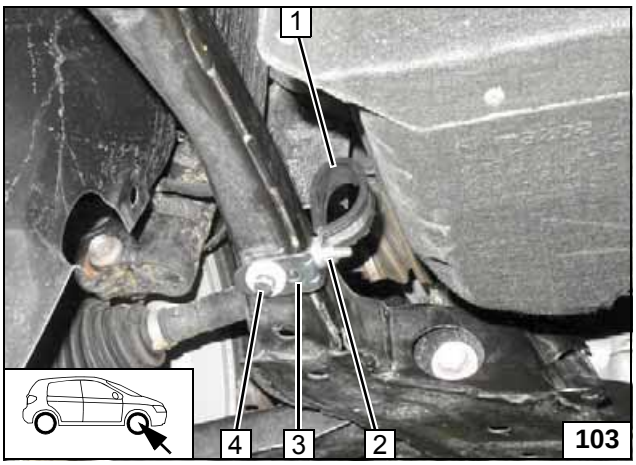
1 M6x20 bolt, large diameter washer, spring lockwasher (8-10Nm)
2 Angle bracket

Installing angle bracket



1 M6x20 bolt, flanged nut (8-10Nm)
2 38 mm dia. rubber-coated p-clamp

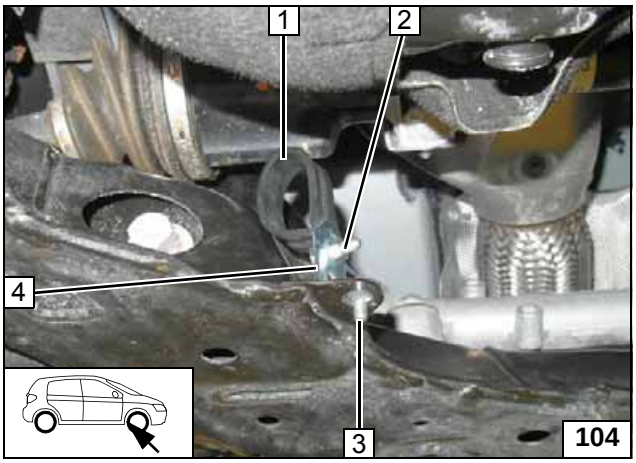
Mounting p-clamp



Insert M6 rivet nut into existing hole at position **4** . Install bolt loosely, will be tightened later when fastening the engine trim.

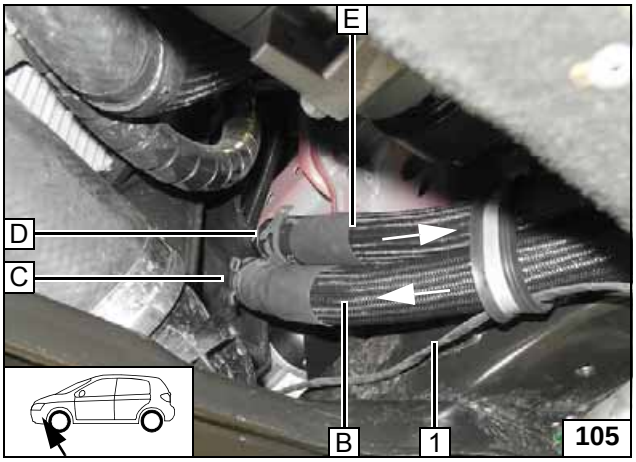
1 38 mm dia. rubber-coated p-clamp
2 M6x20 bolt, flanged nut (8-10Nm)
3 Angle bracket
4 M6x20 bolt, spring lockwasher, large diameter washer, rivet nut

Mounting p-clamp



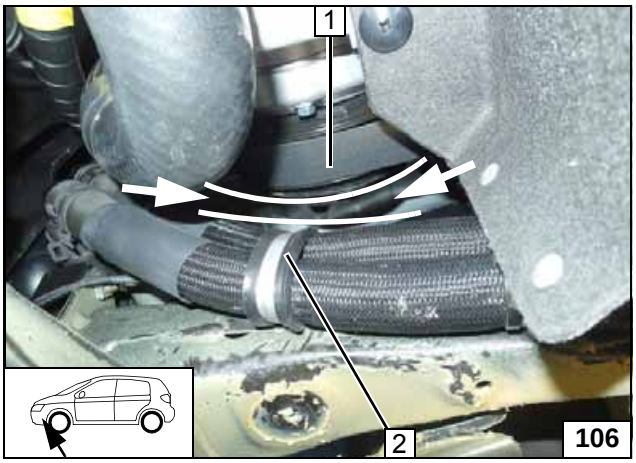
1 38 mm dia. rubber-coated p-clamp
2 M6x20 bolt, flanged nut (8-10-Nm)
3 M6x16 bolt, lock washer, existing hole
4 Angle bracket

Mounting p-clamp

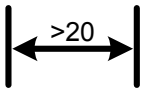


1 Circulating pump wiring harness

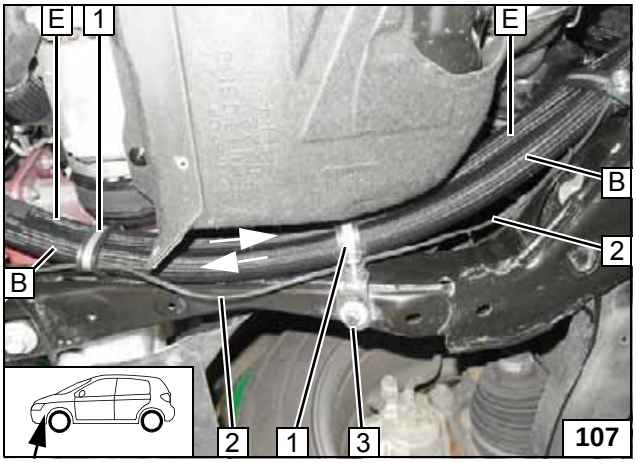
Routing in engine compart-ment



1 A/C compressor
2 Rubber-coated p-clamp



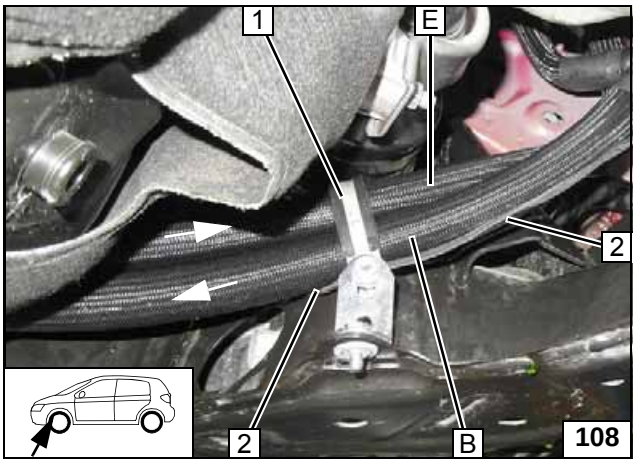
Aligning hoses



Remove bolt at position **3**, will be reinstalled later together with the engine trim.

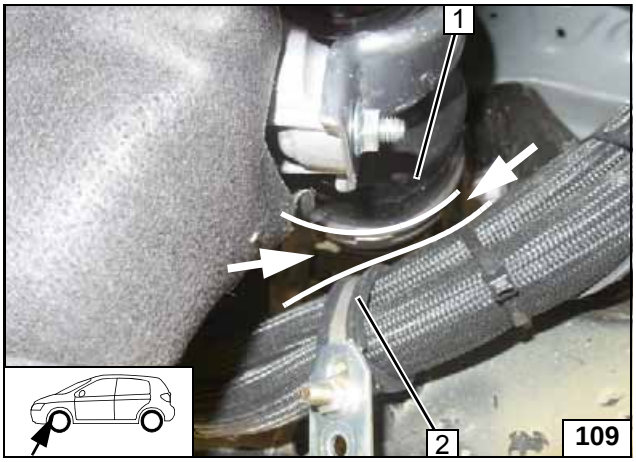
1 38 mm dia. rubber-coated p-clamp [2x]
2 Circulating pump wiring harness

Routing in engine compart-ment

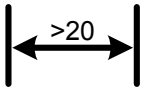


1 38 mm dia. rubber-coated p-clamp [2x]
2 Circulating pump wiring harness

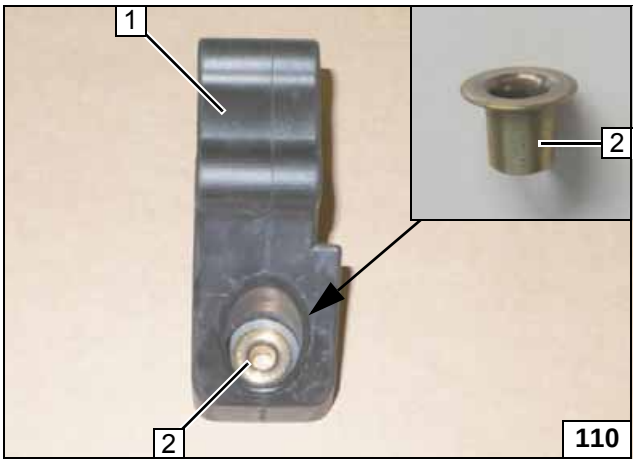
Routing in engine compartment



1 Drive shaft
2 Rubber-coated p-clamp

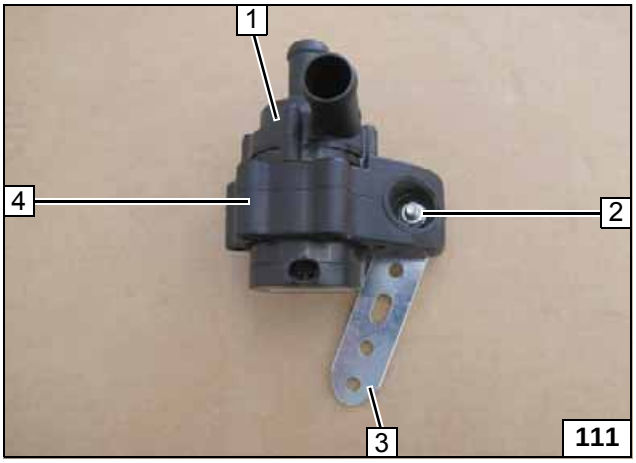


Routing in engine compartment



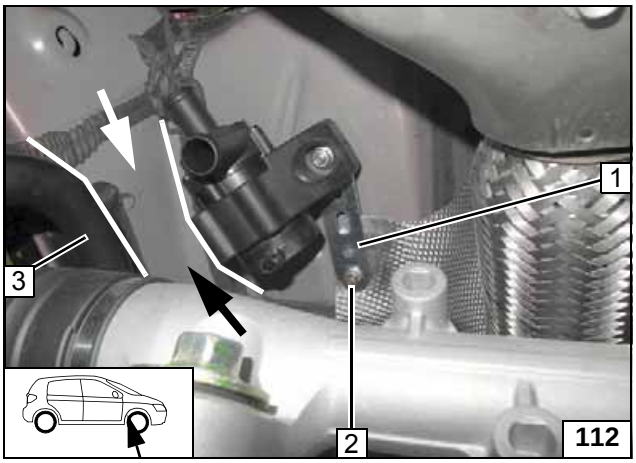
1 Circulating pump bracket
2 Support sleeve

Installing support sleeves



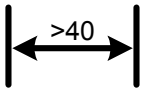
1 Circulating pump
2 M6x25 bolt, flanged nut (8-10Nm)
3 Perforated bracket
4 Circulating pump mount

Premounting circulating pump

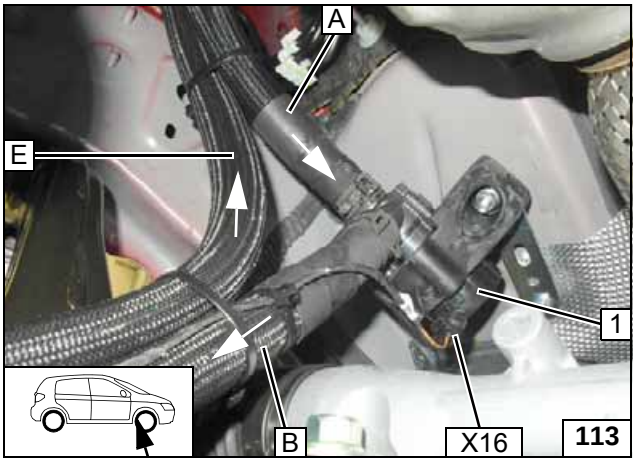


Original vehicle flanged nut at position **2** serves as a spacer between vehicle body and heat shield plate.

1 Perforated bracket
2 Original vehicle stud bolt, M6 flanged nut (8-10Nm)
3 Stabiliser bar



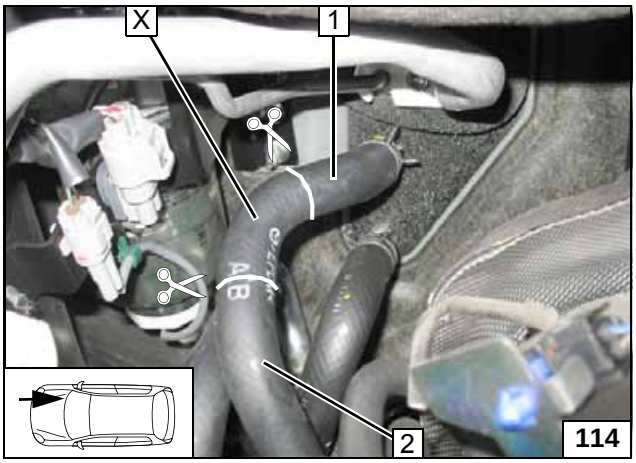
Installing circulating pump



Route hoses **A** and **E** to the heat exchanger.

1 Circulating pump
X16 Connector of circulating pump wiring harness

Routing in engine compartment

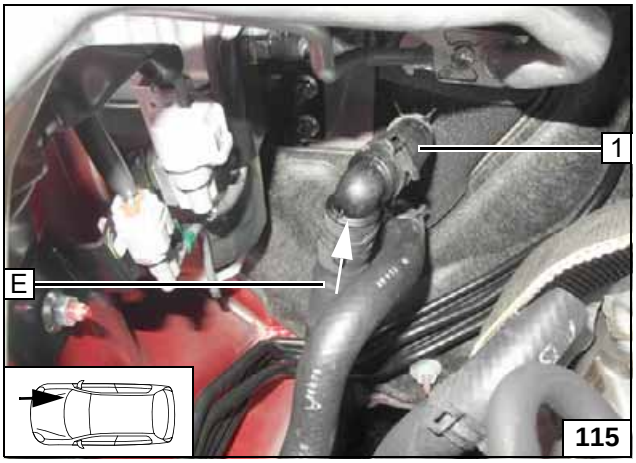


Cut off hose of engine outlet / heat exchanger inlet at the markings.

1 Hose section of heat exchanger inlet
2 Hose section of engine outlet

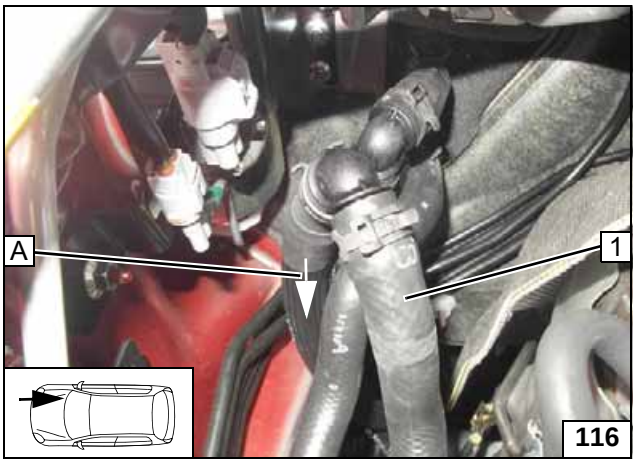
X =

Cutting point



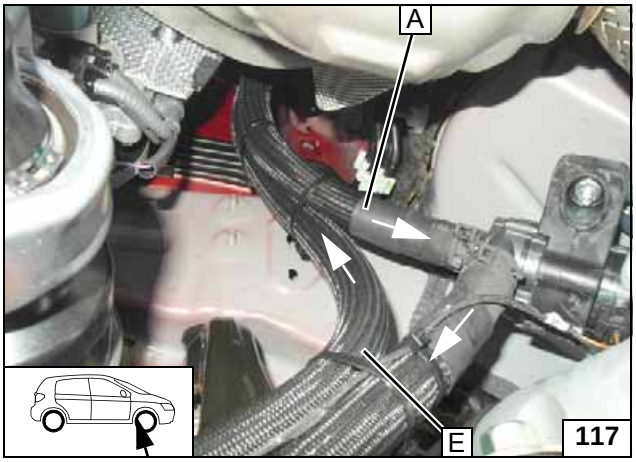
1 Hose section of heat exchanger inlet

Connecting heat exchanger inlet



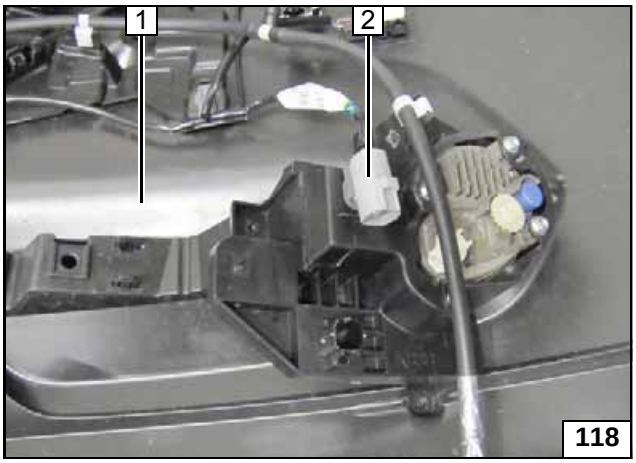
1 Hose section of engine outlet

Connecting engine outlet



Align hoses **A** and **E** and fasten with cable ties.
Ensure sufficient distance from neighbouring components, correct if necessary.

Fastening hoses

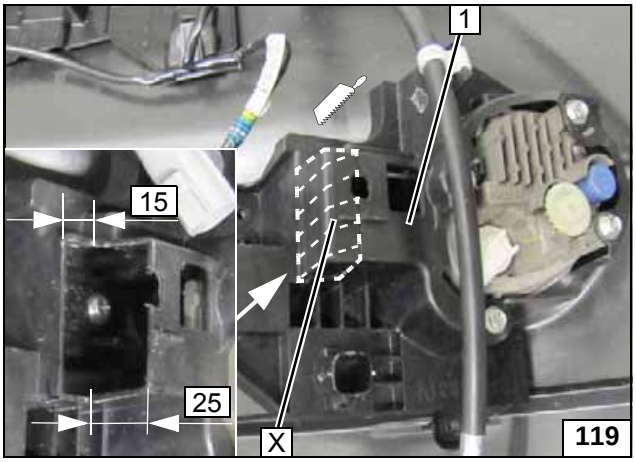


Preparing Bumper

Vehicles with front fog lights and parking assistance

1 Bumper, right side
2 Grey connector of parking assistance

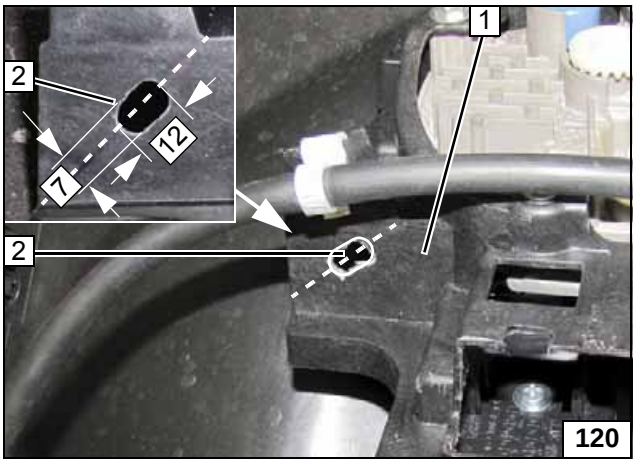
Detaching grey connector



1 Front fog light housing on the right side

X = 

Adapting housing



Drill oblong hole **2** centrally on the diagonal line as shown.

1 Front fog light housing on the right side

Adapting housing

Install grey connector **1** in drilled oblong hole.

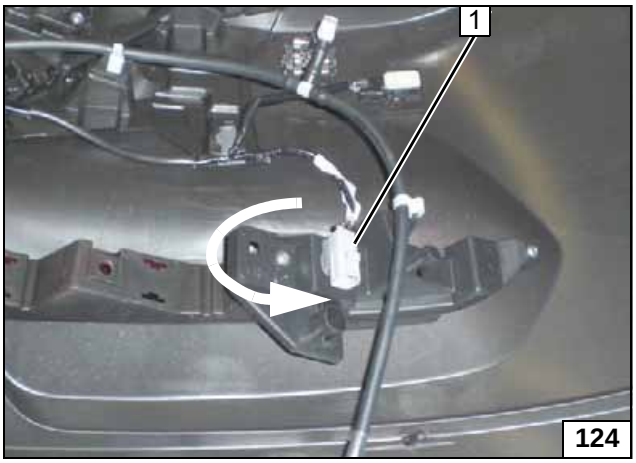
Installing grey connector

Stick heat protection film **1** around the hose of the headlight washer system pump.

Sticking on heat protection film

Stick on self-adhesive foam **1** as shown.

Sticking on heat protection film



Vehicles without front fog lights

Detach parking assistance connector **1** (figure shows original position) from bumper, turn by 180° and reinsert.

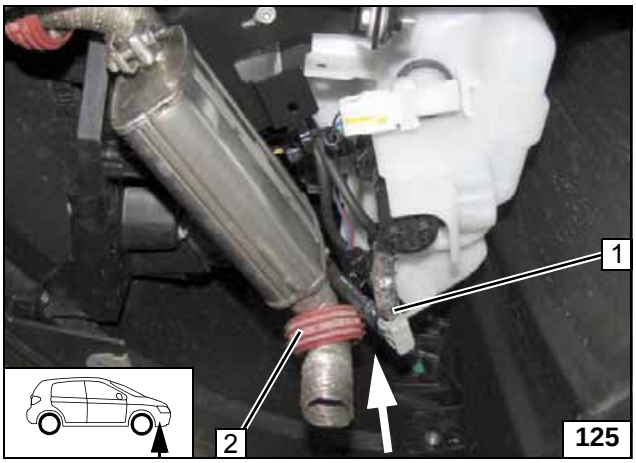
Reinstalling connector

Final Work

Mount bumper.

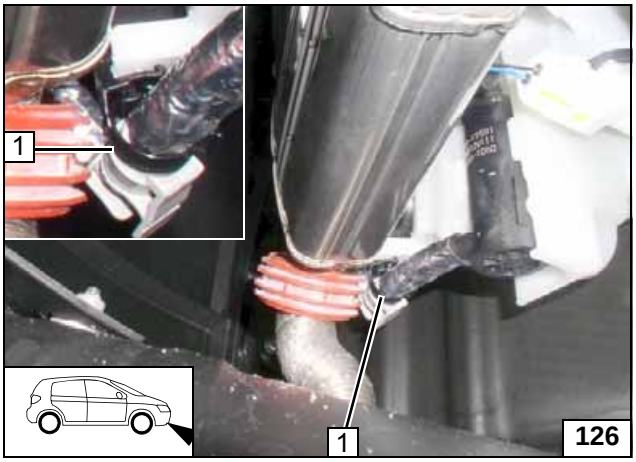
Align spacer bracket **2** with hose section of headlight washer system **1**.

Checking distance



Tighten premounted clip-type cable tie around hose section of headlight washer system.

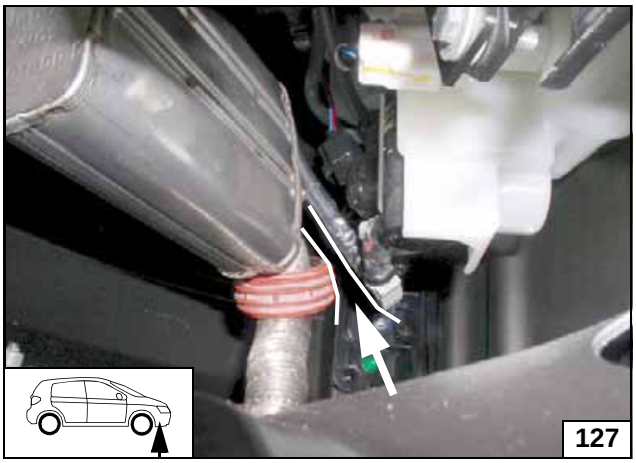
Securing hose section



Ensure sufficient distance to neighbouring components, correct if necessary.

≥ 10 mm

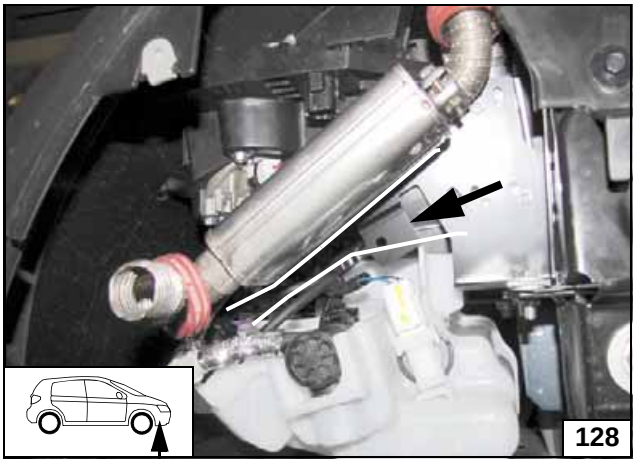
Checking distance

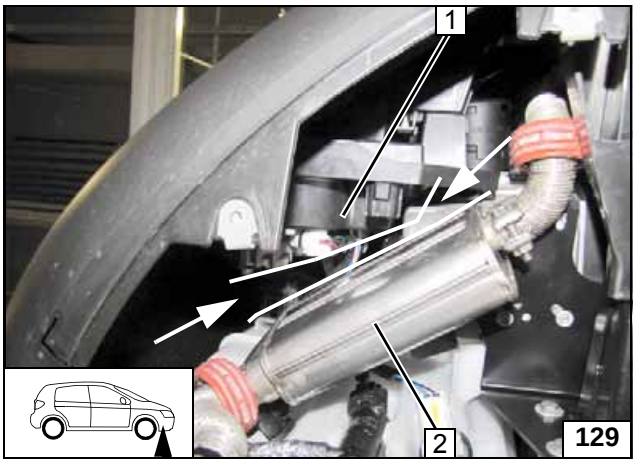


Ensure sufficient distance between exhaust silencer and neighbouring components, correct if necessary.

≥ 20 mm

Checking distance

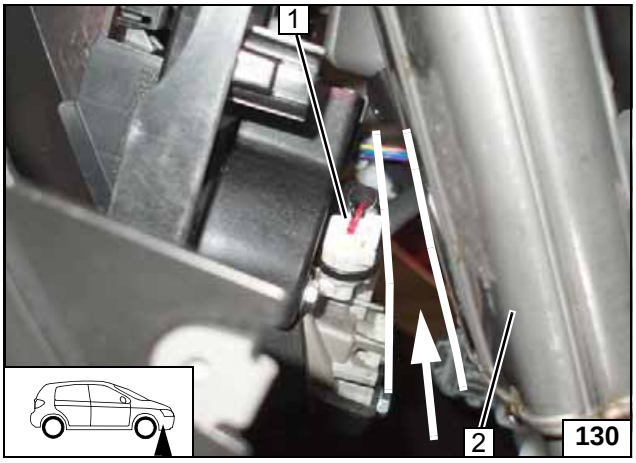




Install white connector on front fog light (if present).
Ensure sufficient distance between exhaust silencer **2** and neighbouring components, correct if necessary.

≥ 20 mm

Checking distance

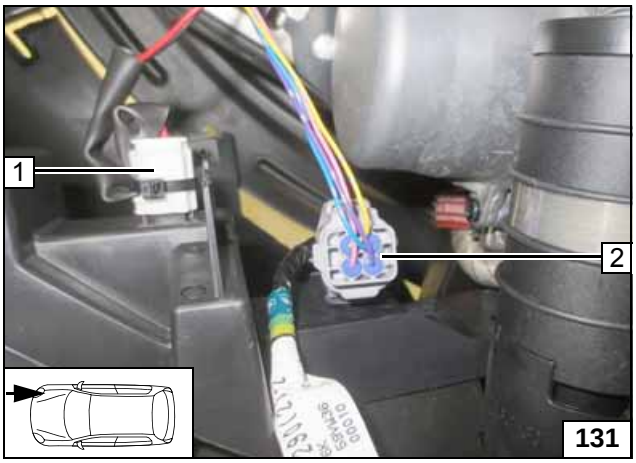


Ensure sufficient distance between exhaust silencer **2** and neighbouring components, correct if necessary.

1 White connector of front fog light

≥ 20 mm

Checking distance

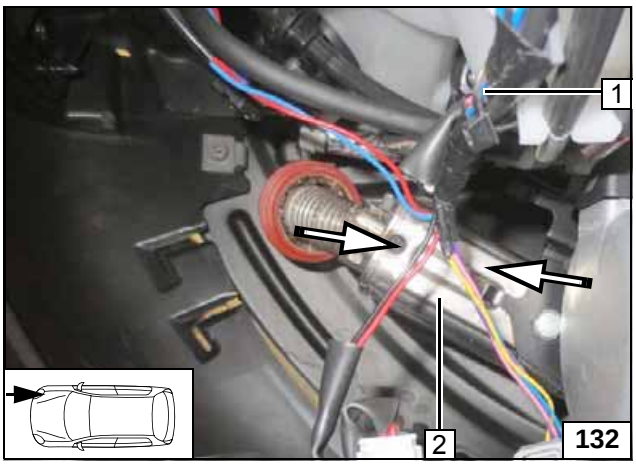


Vehicles without front fog lights

Figure with headlight removed.

1 Front fog light connector on dummy plug
2 Parking assistance connector (if present, turned by 180°)

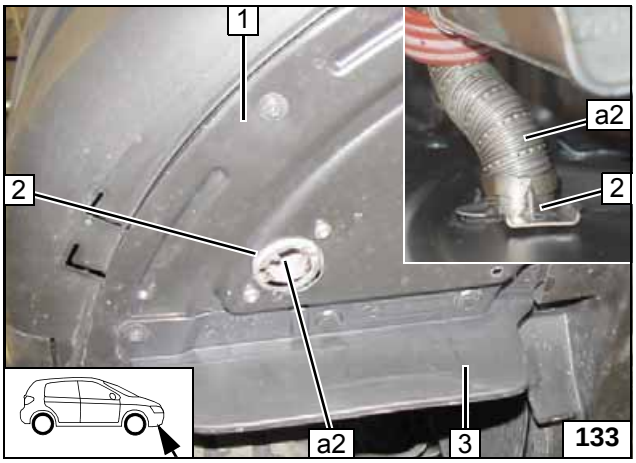
Installing connector



Attach front fog light and parking assistance wiring harnesses to original vehicle lines using cable tie **1**.
Ensure sufficient distance from exhaust silencer **2** as shown, correct if necessary.

≥ 20 mm

Checking distance



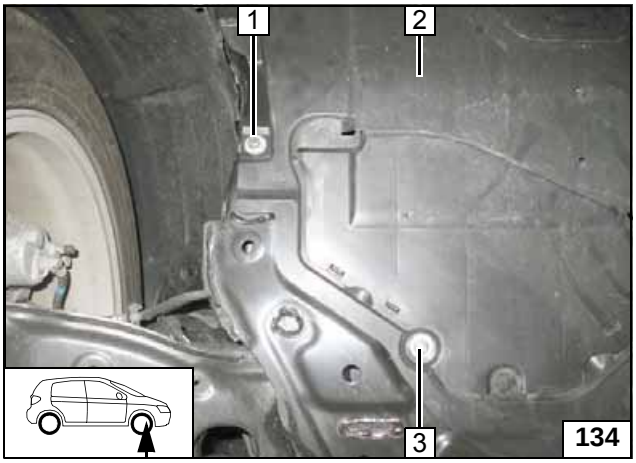
Work steps 6 to 8.

Install wheel well trim **1** on the right side.

2 Exhaust end fastener
3 Cowl panel installed

Installing exhaust pipe a2

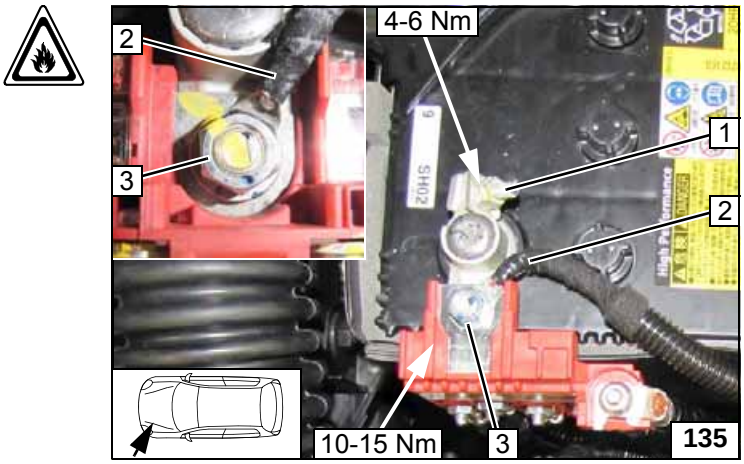
Ensure sufficient distance between exhaust silencer and neighbouring components, correct if necessary.



Install M6x20 bolt, spring lockwasher, large diameter washer and angle bracket (premounted rubber-coated p-clamp) in position **1**. Mount M6 flanged nut and large diameter washer on M6 bolt at position **3** (8-10Nm)!

2 Engine trim

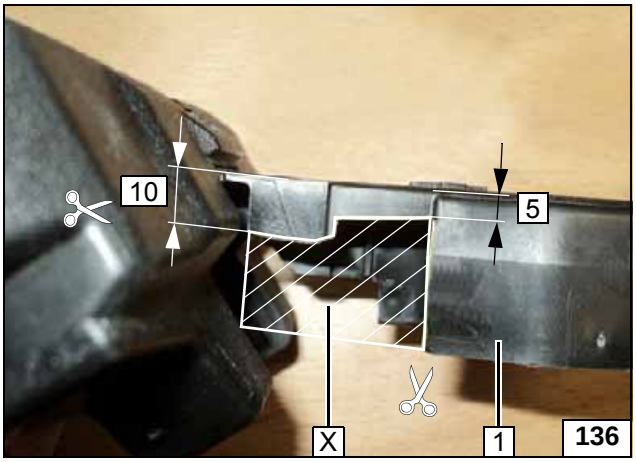
Installing engine trim



Remove positive battery terminal cover.

1 Original vehicle bolt, positive battery terminal
2 Red (rt) positive wire insulated
3 Original vehicle nut

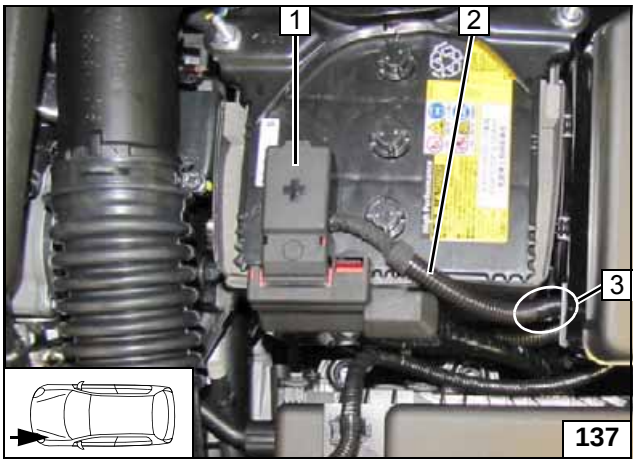
Connecting positive battery terminal



Cut out cover cap of positive battery terminal **1** at the marking.

X =

Cutting out cover cap



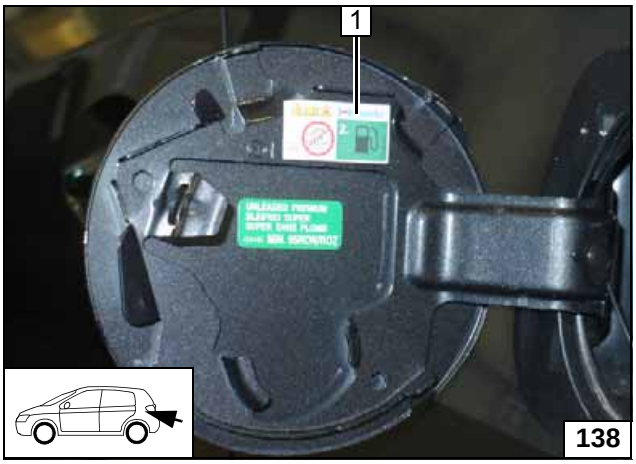
1 Cover of positive battery terminal
2 Red (rt) positive wire in 10mm dia. corrugated tube **S**
3 Cable tie

Installing cover / connecting corrugated tube

WARNING!
Reassemble the removed components in reverse order according to the manufacturer's instructions (MESI). Check all hoses, clamps and all electrical connections for firm seating. Insulate all loose lines and tie back.
Only use manufacturer-approved coolant.

Spray the heater components with anti-corrosion wax (Mazda underbody wax)

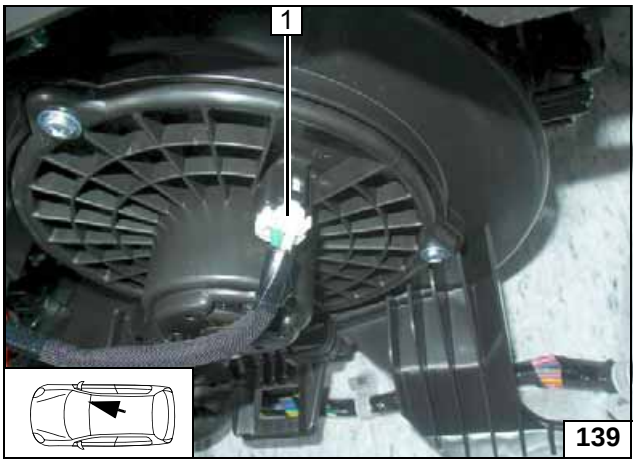
- **Only install the instrument panel trim after inspecting the PWM GW!**
- **Connect the battery by performing/following the specified actions as per MESI 'REMOVING/INSTALLING THE BATTERY [SKYACTIV - D2.2]' !**
- **Fill and bleed the coolant circuit according to the vehicle manufacturer's specifications**
- **Program MultiControl CAR or digital timer, teach Telestart transmitter.**
- **Make settings on the A/C control panel according to the 'operating instructions'.**



Apply the 'Switch off parking heater before refuelling' sticker **1** in the area of the filler neck.

Applying sticker

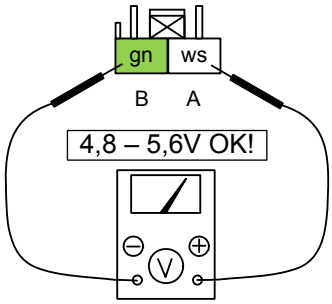
- **See installation instructions for initial start-up and function check.**
- **Check voltage in parking heating mode (see settings for end customers) at fan motor. Target value 4.8 - 5.6V (in driving mode, corresponds to approx. level 3)! See the description below:**



Measuring the voltage at the fan motor

Measure the voltage between the two pins!

1 2-pin connector of fan motor



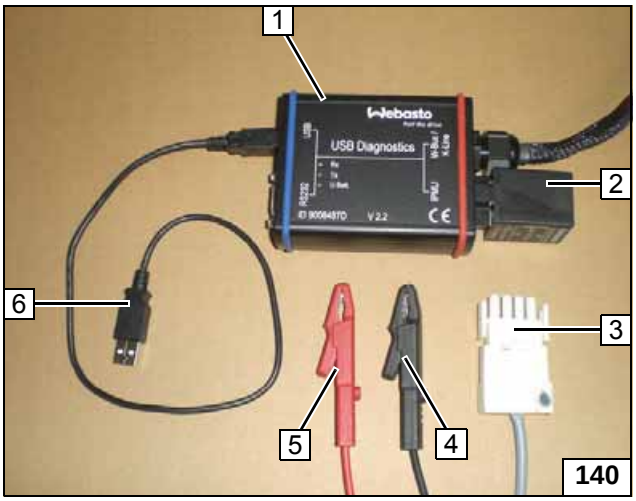
Voltage measurement

Only for deviations from the target value: Adjust the PWM GW value for the duty cycle via the Webasto diagnosis in increments of 2% (see section ‘Adjusting the Fan Speed’)!

Adjusting the Fan Speed

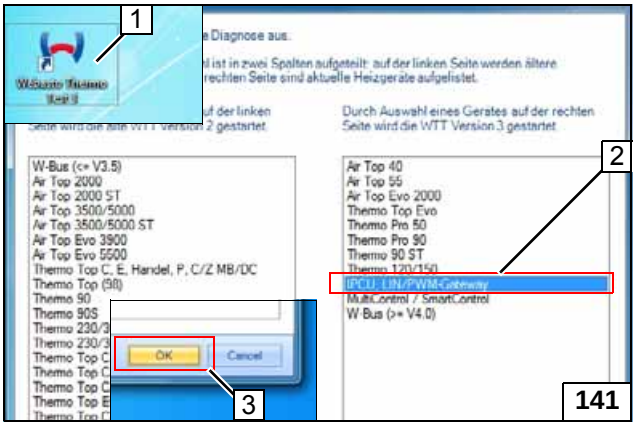
Thermo Test Diagnosis, Mazda order no.: 4100-77-725*
(software version V3.1 and later);
free update via: www.dealers.webasto.com;
support via Hotline:
technikcenter@webasto.com

Thermo Test Diagnosis



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

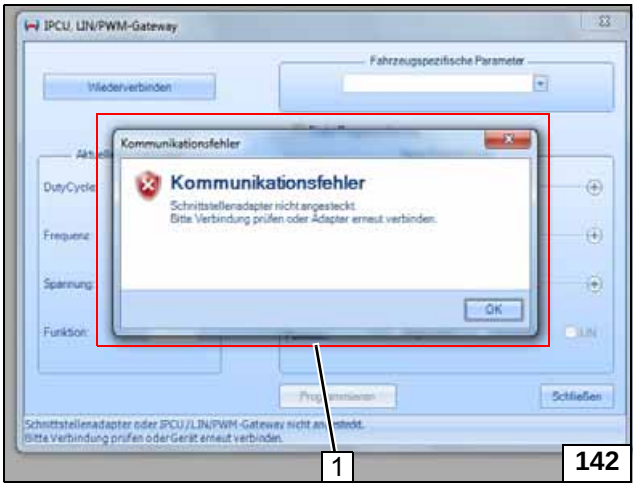
Produce all connections.
Start Webasto Thermo Test **1**



2 ‘IPCU LIN/PWM Gateway’ selection
3 Confirm with ‘OK’

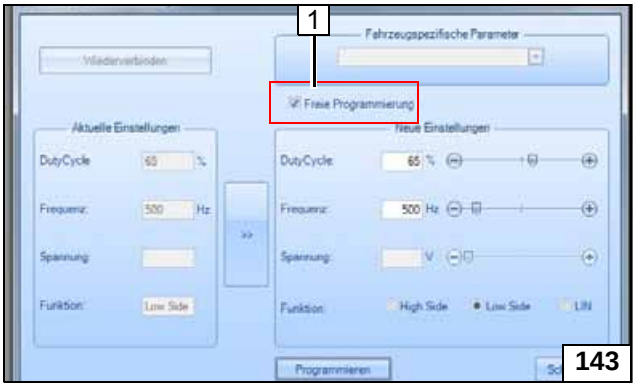
Selecting PWM GW

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!

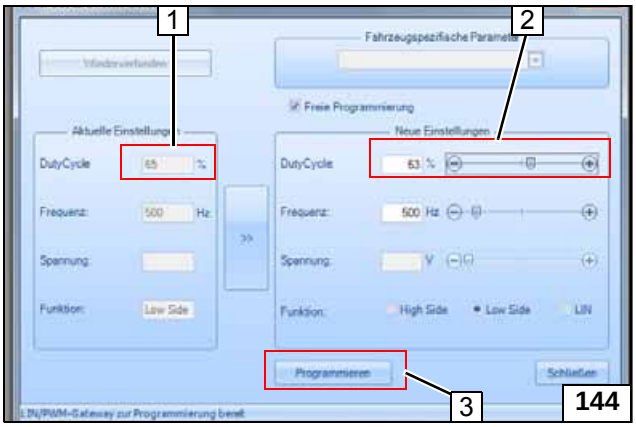


Error message

1. Enable ‘Free Programming’



Selecting ‘Free Programming’



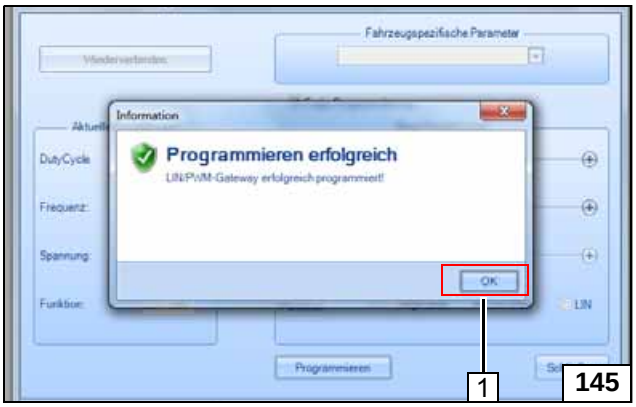
Factory settings are shown on the left. Adjust duty cycle in 2% increments. Enter a new value for the duty cycle on the right:

- for a speed increase **-** 2%
- for a speed reduction **+** 2%.

Do not change the presettings for frequency and function!

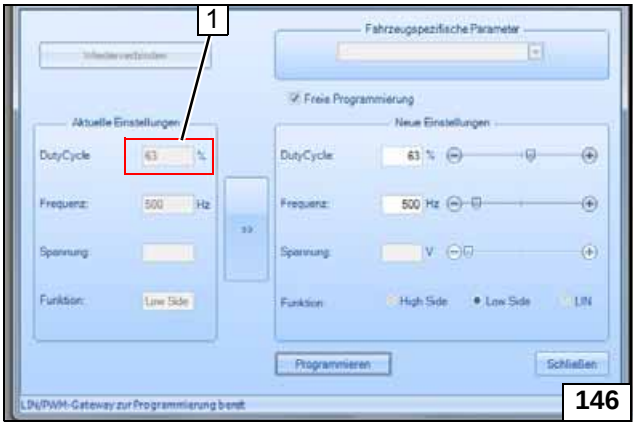
1. Duty cycle 65% preset
2. Duty cycle 63% selected
3. Confirm ‘Program’

Selecting duty cycle



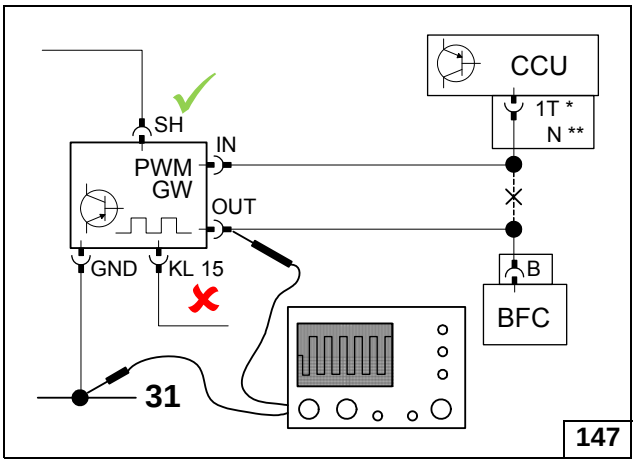
1 Confirm with ‘OK’

Programming PWM GW

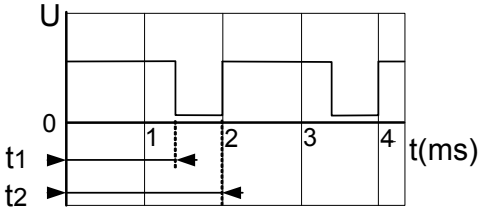


Reselect the PWM GW diagnosis.
The new settings are displayed on the left.
Install the PWM GW and recheck the voltage (target values 4.8 - 5.6V) via the fan motor connector.
If values are different, perform further adjustments!

Checking settings

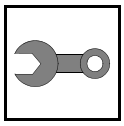


Status:
- Heating: **ON**
- Coolant temperature: **> 55 °C**
- Ignition: **OFF**



Duty Cycle = t1 / t2 x 100 = 65% (or adjusted value)
Frequency = 1 / t2 = 500 Hz

Performing a function check with the oscilloscope



Webasto Thermo & Comfort SE
Postfach 1410
82199 Gilching
Germany
Internet: www.webasto.com
Technical Extranet:
http://dealers.webasto.com

Webasto
Feel the Drive

Operating Instructions for Manual Air-Conditioning

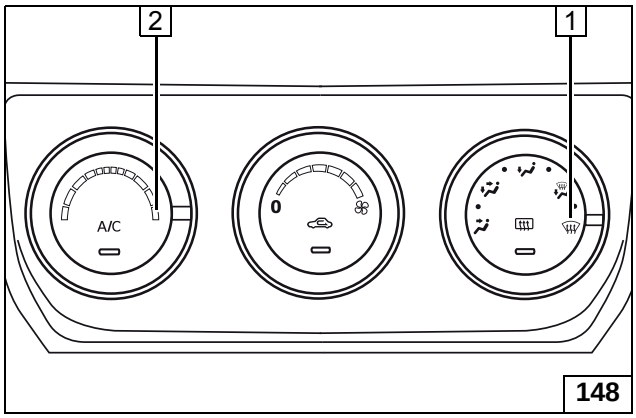
Please remove page and add to the vehicle operating instructions.

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 combi 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.

Note:
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.

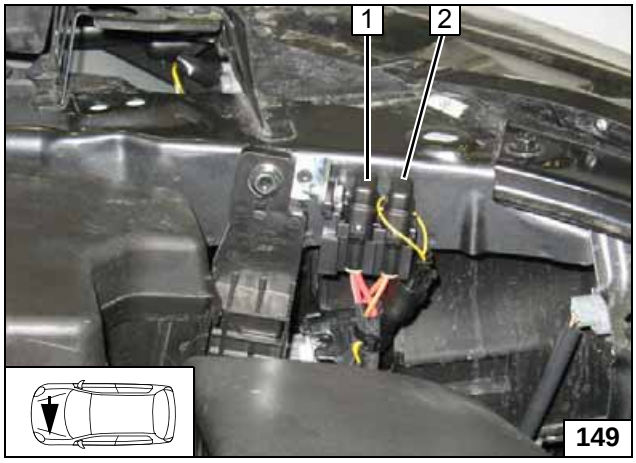
Information on i-stop:
The i-stop function is disabled if battery power is low. As a result, the time until automatic switch-off of the engine may be longer according to parking heater operation.
This is not a malfunction!
Depending on the vehicle use, it may be necessary to charge the vehicle battery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

Before parking the vehicle, make the following settings:



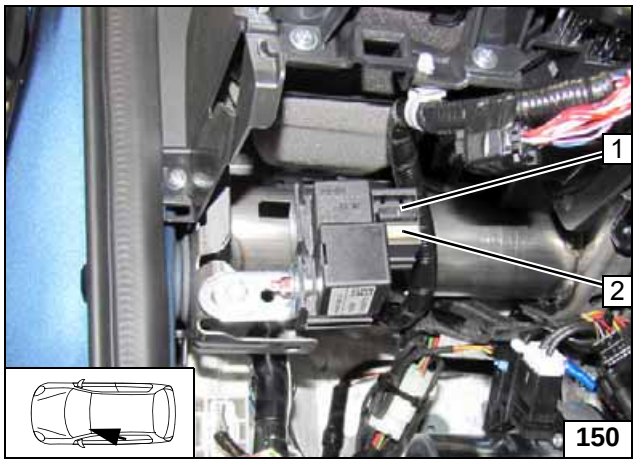
1 Air outlet to windscreen
2 Set temperature to ‘max.’

A/C control panel



1 30A passenger compartment main fuse F2
2 20A heater fuse F1

Engine compartment fuses



1 1A heater control fuse F3
2 25A fan fuse F4

Operating Instructions for Automatic Air-Conditioning

Please remove page and add to the vehicle operating instructions.

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 combi 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.

Note:
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.

Information on i-stop:
The i-stop function is disabled if battery power is low. As a result, the time until automatic switch-off 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.

Before parking the vehicle, make the following settings:

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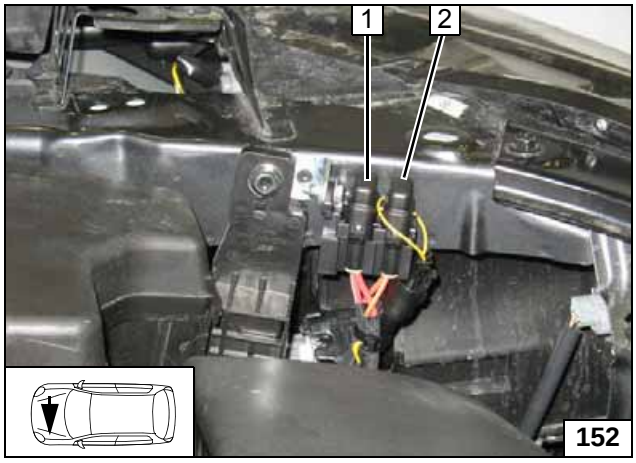
1 Air outlet to windscreen
2 Set temperature on both sides to ‘max.’

A/C control panel



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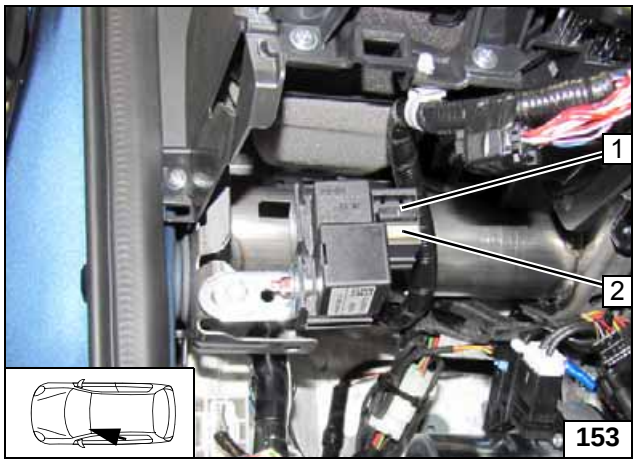
1 30A passenger compartment main fuse F2
2 20A heater fuse F1

Engine compartment fuses



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