Water Heater

***Thermo Top C* Motorcaravan Parking Heater** E1 00 0002

Installation Documentation

Fiat Ducato 250 / Multijet

Diesel
From model year 2006
Left-hand drive vehicle
Manual / automatic air-conditioning system

WARNING!

Hazard warning:

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

NEVER attempt to install or repair Webasto heating or cooling systems if you have not successfully completed the company training and thereby acquired the required technical skills, or if you do not have access to the required technical documentation, tools and equipment needed to carry out correct installation and repairs.

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

The initial startup is to be executed with the Webasto Thermo Test Diagnosis.

Webasto does not accept any liability for defects and damage that are attributable to installation by untrained staff.

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Table of Contents

Validity

Manufacturer	Model	Type	EG-BE No. / ABE
Fiat	Ducato	Multijet	e3 * 2007 / 46 * 0044 * ...
Fiat	Ducato	250	L 778
Fiat	Ducato	250L	L 779

Engine model	Output in kW	Displacement in cm³
Diesel	88	2287
Diesel	96	2287
Diesel	102	2287
Diesel	109	2287
Diesel	110	2999
Diesel	116	2999
Diesel	130	2999

Vehicle and engine types, equipment variants and national specifications not listed in this installation documentation have not been tested. However, installation according to this installation documentation may be possible.

The installation location of a digital timer should be coordinated with the end customer before installation.

Heater / Installation Kit

Quantity	Description	Order No.:
1	Basic delivery scope of *Thermo Top C* Motorcaravan	9015824A
from MY 2006		
1	Installation kit for Fiat Ducato 250 Diesel Trade Motorcaravan MY 2006 Multijet 130 and 140	9015693F
1	Installation kit for Fiat Ducato 250 Diesel Trade Motorcaravan MY 2006 Multijet 120.150 and 160	9016330C
from MY 2011		
1	Installation kit for *Thermo Top C* Motorcaravan Diesel 12V RV Fiat Ducato Euro 5 MY 2011	9026600B

must also be ordered for automatic air-conditioning:

Quantity	Description	Order No.:
1	Automatic air-conditioning kit for Fiat Ducato 250	9017269C

Foreword

This installation documentation applies to Fiat Ducato 250 / Multijet Diesel vehicles - for validity, see page 2 - from model year 2006 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’.

However, the stipulations in this ‘installation documentation’, the ‘operating instructions’ and ‘installation instructions’ for the *Thermo Top C* must always be observed.
The corresponding rules of technology and any information from the vehicle manufacturer should be observed during the installation work.

General Instructions

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 have to audibly click into place during installation.

Sharp edges should be fitted with rub protection. Spray unfinished body areas, e.g. drilled holes, with anti-corrosion wax (Tectyl 100K, Order No. 111329).

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

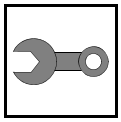
Special Tools

- Torque wrench for 2.0 - 10 Nm
- Hose clamping pliers

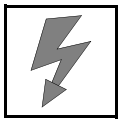
Explanatory Notes on Document

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.

Mechanical System

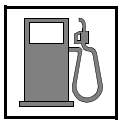


Electrical System

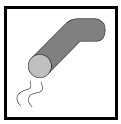


Coolant Circuit

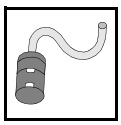
Fuel



Exhaust Gas



Combustion Air



Software

Special features are highlighted using the following symbols:

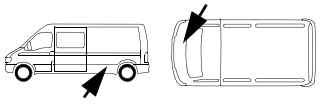
Specific risk of injury or fatal accidents.

Specific risk of damage to components.

Specific risk of fire and explosion.

Reference to general installation instructions of Webasto components or to the manufacturer's vehicle-specific documents.

Reference to a special technical feature.



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

All dimensions are in mm.
Tightening torque of hose clamps = 2.0 + 0.5 Nm.
Tightening torque of Ejot screws, Ejot studs = 10 Nm.

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Preliminary Work

WARNING!

- Open the fuel tank cap.
- Ventilate the fuel tank.
- Close the fuel tank cap again.
- Depressurise the cooling system.
- Disconnect the battery.
- Remove the air filter with the temperature sensor.
- Remove the underride protection on the right and on the left, if present.
- If the wing trim is present, remove the wheel well trim on the left and on the right, otherwise detach only on the front left side (see the dismantling instructions).
- Detach the upper wing trim on the left and right, if present (see the dismantling instructions).
- Remove the left and right-hand headlight (see the dismantling instructions).
- Remove the front grille and bumper trim (see the dismantling instructions).
- Open the fuse box at the front left in the engine compartment.
- Remove the lower footwell trim on the front passenger's side (only with automatic air-conditioning).

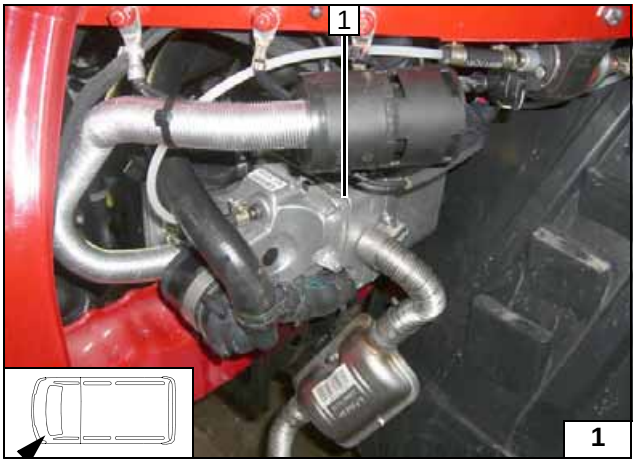
The following work should only be performed during the corresponding installation sequence:

- Open the tank-fitting service lid.
- Remove the fuel tank sending unit in accordance with the manufacturer's instructions.

Heater

- Remove years that do not apply from the type and duplicate label.
- Attach the duplicate label (type label) visibly in the appropriate place in the engine compartment.

Please remove page 29 ‘Operating Instructions for End Customer’ and add to the operating instructions.



Heater Installation Location

1 Heater

Installation location

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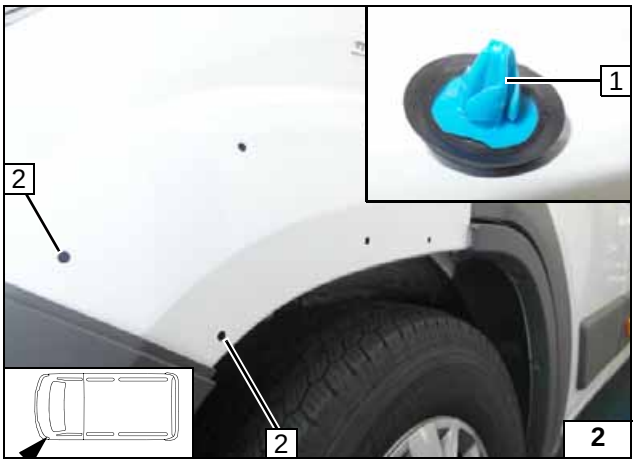
Dismantling Instructions from MY 2014

Only needed if there is wing trim.
Remove retaining clip **1** [2x] at position **2** and take care not to damage the locking tab!

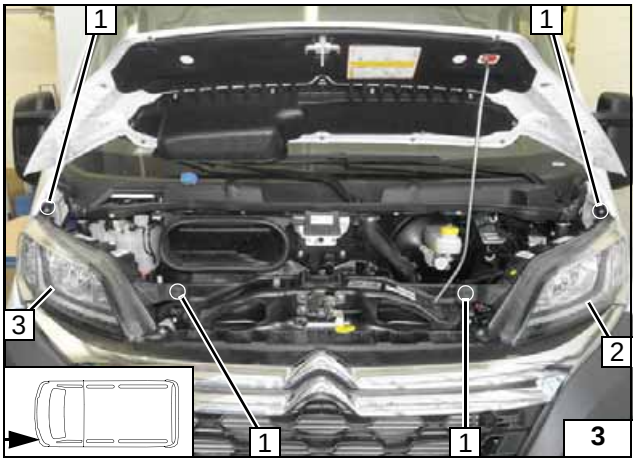
Detaching upper wing trim on the left and right



Further dismantling instructions are demonstrated on a Citroen Jumper but also apply for a Fiat Ducato!

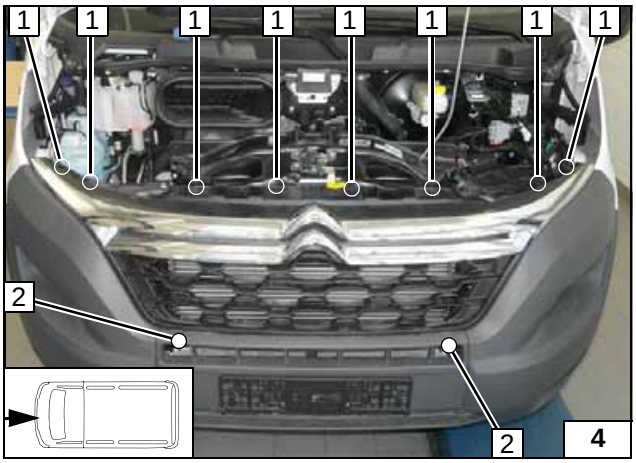
Removing headlights on the right and on the left

1 Remove bolts [4x]
2 Left headlight
3 Right headlight



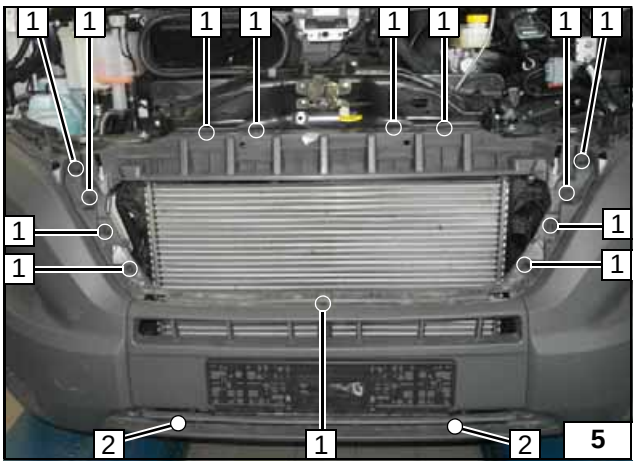
Removing radiator grille

1 Remove bolts [8x]
2 Remove bolts (hidden) [2x]



Removing middle section of front bumper trim

1 Remove bolts [13x]
2 Remove bolts (hidden) [2x]



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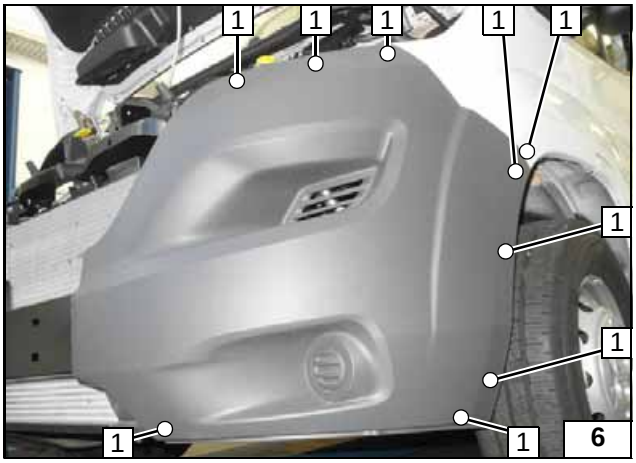
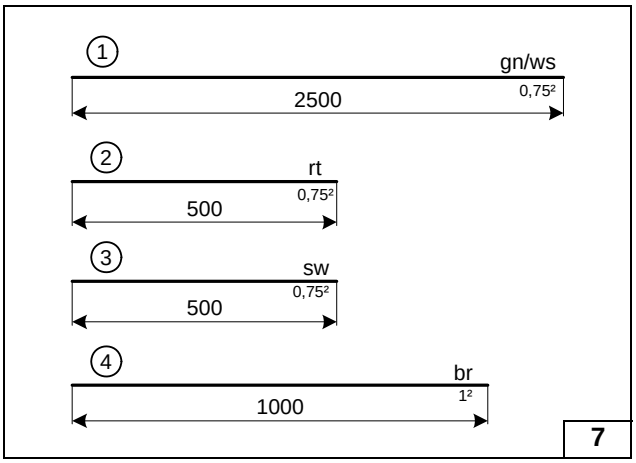


1 Remove bolts (hidden) [9x]

Removing left section of front bumper trim



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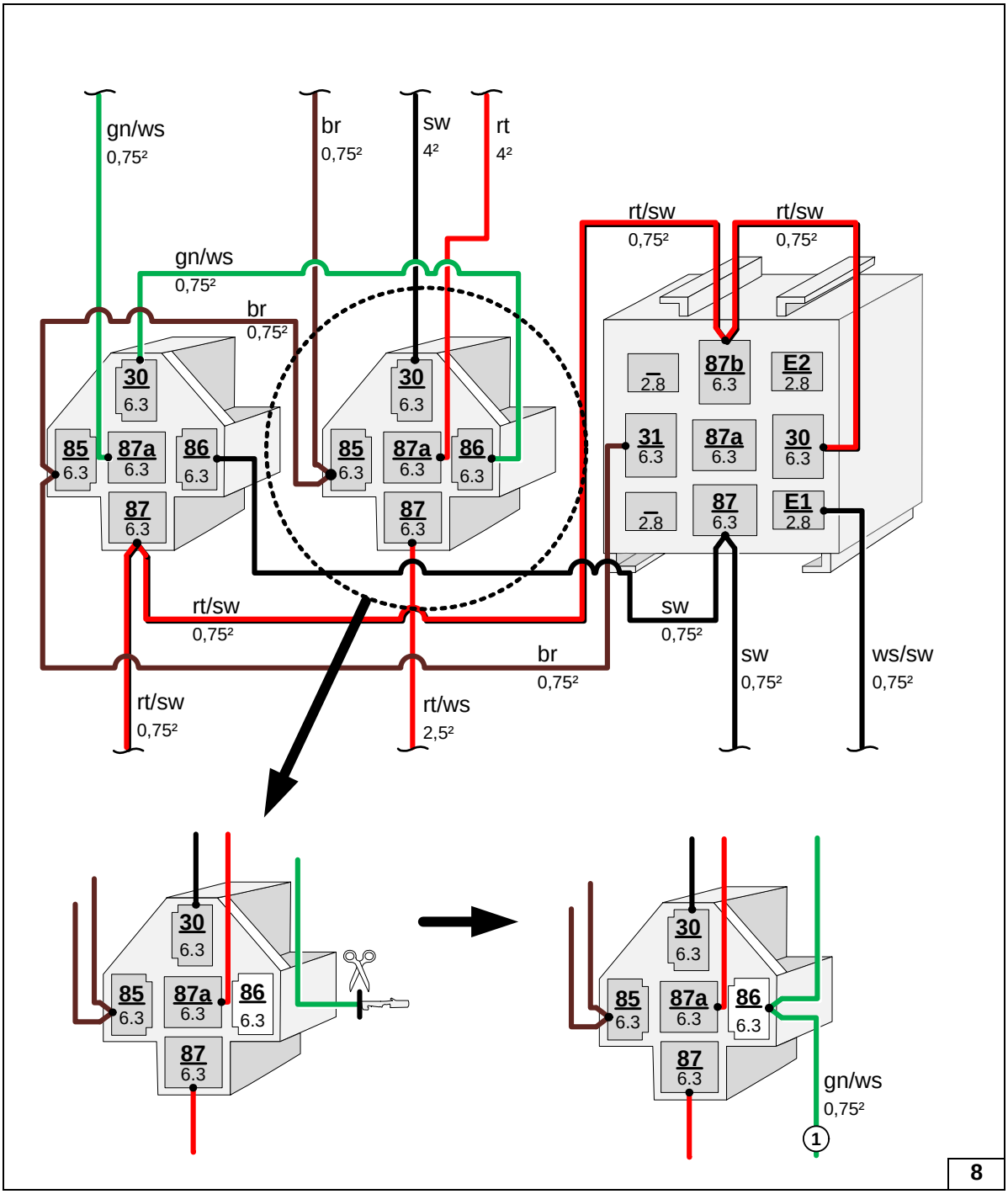
Preparing Electrical System

Only with automatic air-conditioning

Wire sections retain their numbering throughout the entire document.

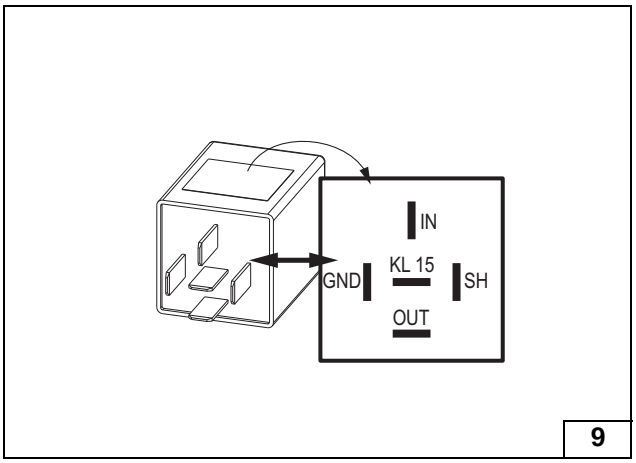
Pull wire ① into provided protective sleeving.

Assigning / preparing wires



8

Connecting green/white (gn/ws) wire ① to K3 relay socket of heater wiring harness



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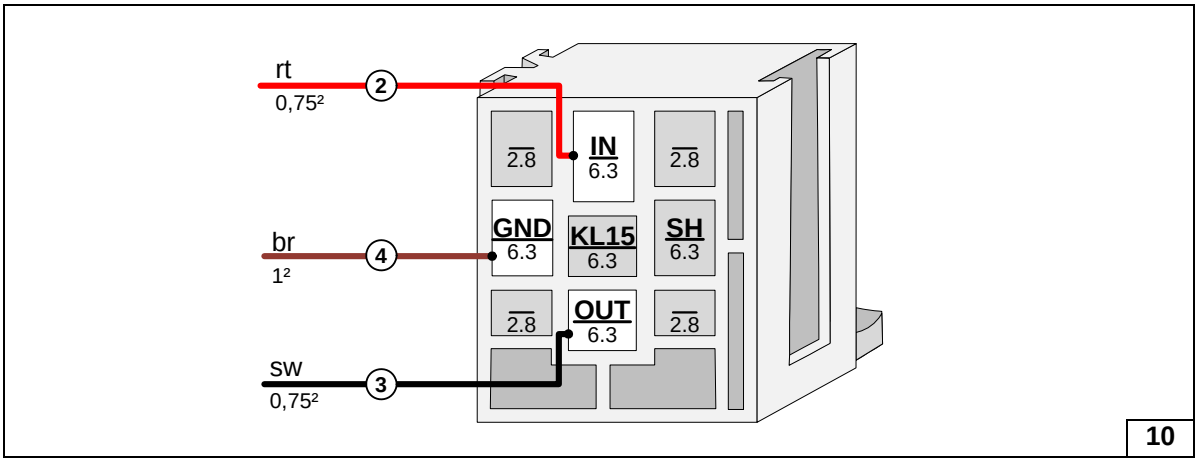
Check the PWM Gateway settings when starting up the heater and adjust if necessary.

Settings:

Duty cycle: 35%
Frequency: 1200Hz
Voltage: 4.2V
Function: High side

View of PWM-GW



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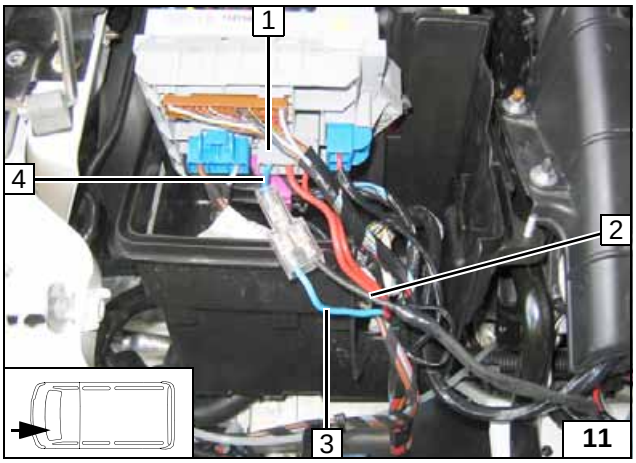
Connecting wires to PWM GW socket



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All vehicles

If possible, switch power supply of heater to existing second battery.

Connection on grey (gr) 3-pin connector **1**, Pin C from central electrical box in engine compartment.
Produce connections as shown in wiring diagram. Insulate red (rt) wire from K3/87a and tie back.

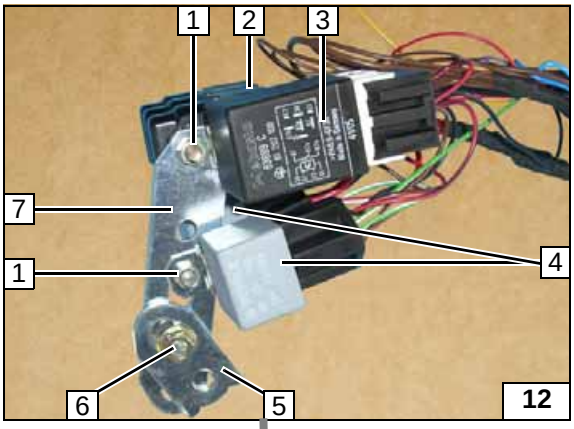
- **2** Black (sw) wire from K3/30
- **3** Wire (blue [bl] or red [rt] or grey/white [gr/ws]) of fan motor
- **4** Wire (blue [bl] or red [rt] or grey/white [gr/ws]) of 3-pin connector Pin C, central electrical box (fan relay)

Connecting central electrical box

Electrical System

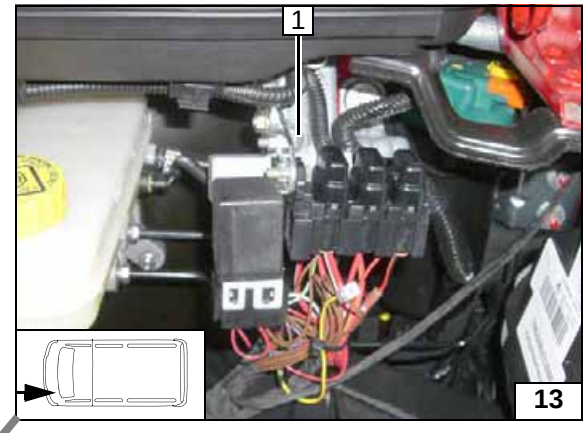
Fuse holder, K3/K4/K5 relay

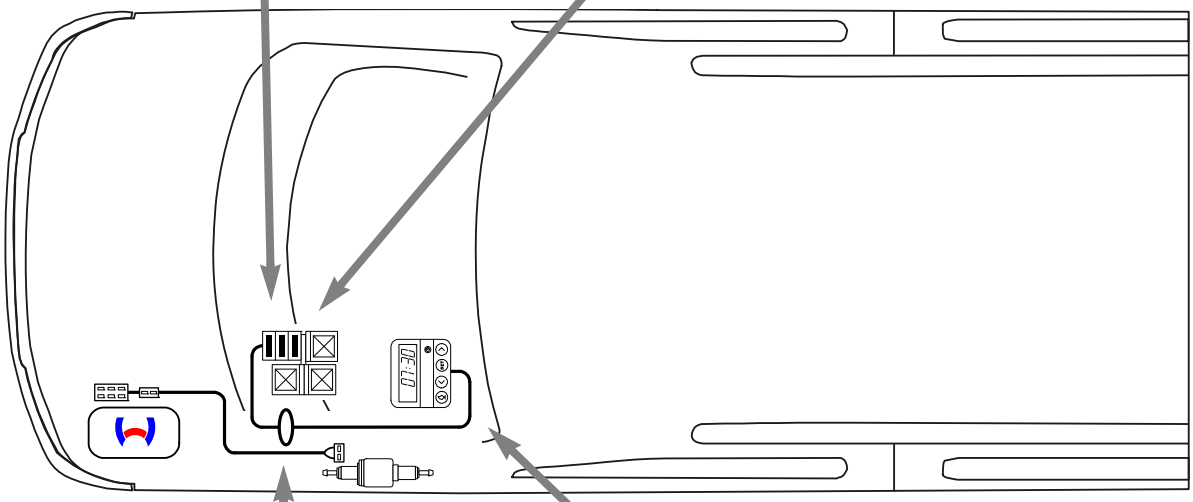
1 M5x16 bolt, washers, nut [2x]
2 Retaining plate of fuse holder
3 K5 relay
4 K3 relay, K4 relay
5 Angle bracket
6 M6x16 bolt, washers, flanged nut
7 Perforated bracket



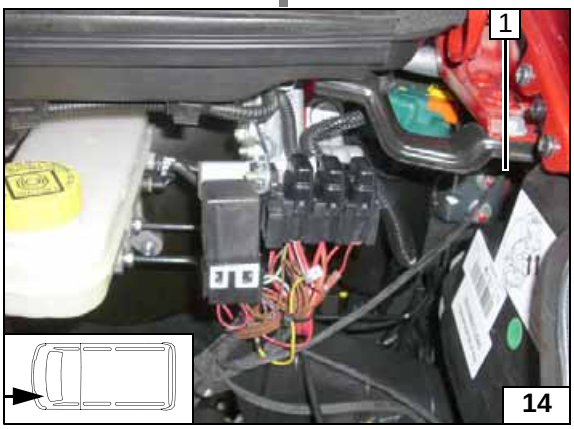
Installation of fuse holder

1 M6x16 bolt, washers, premounted angle bracket, flanged nut



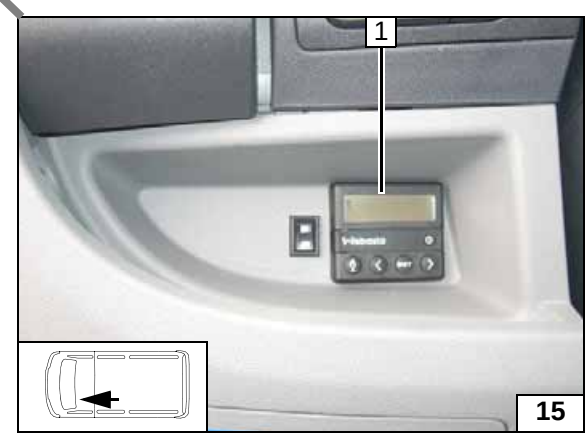


Wiring harness routing diagram



Wiring harness pass through

1 Protective rubber plug

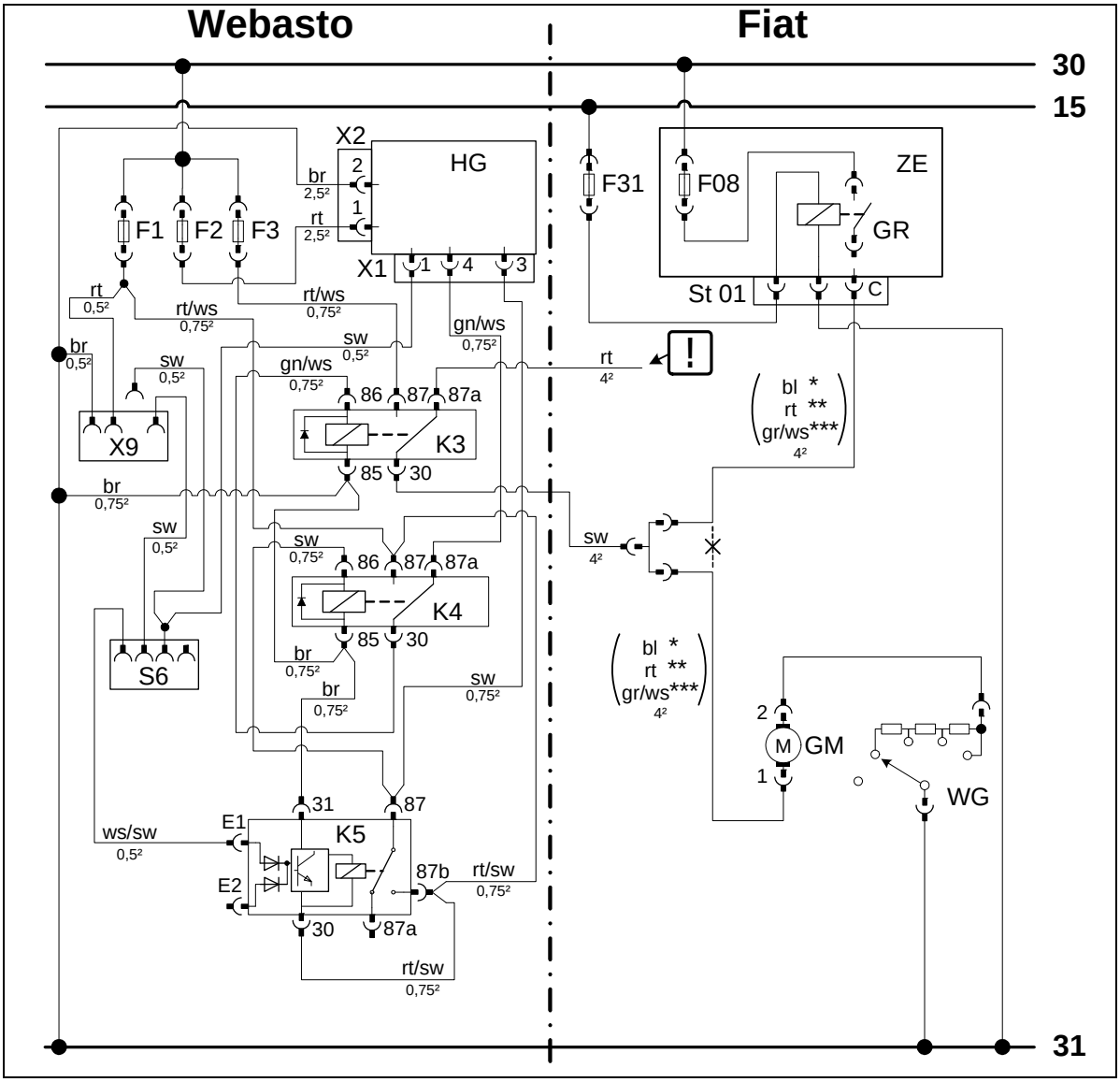


Digital timer

1 Digital timer, changeover switch

Fan Controller for Manual Air-Conditioning

Wiring diagram

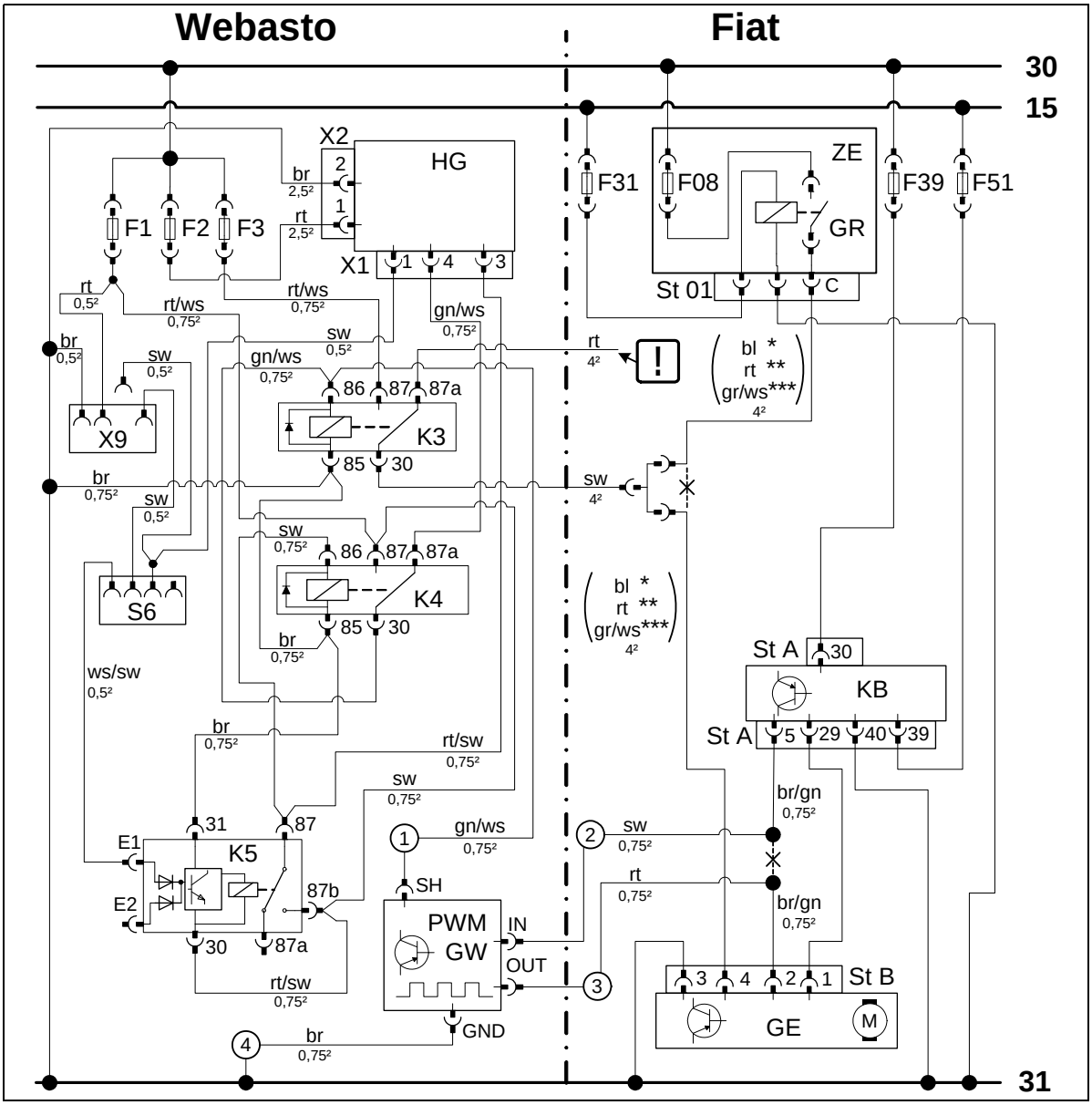


Legend

Webasto components		Components Fiat Ducato 250		Colours and symbols	
HG	TT-C 300 heater	F31	7.5A fuse	rt	red
X1	6-pin heater connector	ZE	Central electrical box	ws	white
X2	2-pin heater connector	GR	Fan relay	sw	black
F1	Fuses 1A	F08	40A fuse	br	brown
F2	Fuse 20	ST01	3-pin connector, grey	gn	green
F3	25A fuse	GM	Fan motor	bl	blue
X9	Connector of heater controls	WG	Resistor group	gr	grey
K3	Fan relay			*	up to MY 2010
K4	Additional relay			**	MY 2011
S6	Changeover switch			***	from MY 2012
K5	Electronic relay			!	Insulate wire ends and tie back
				Wiring colours may vary.	

Fan Controller for Automatic Air-Conditioning

Wiring diagram

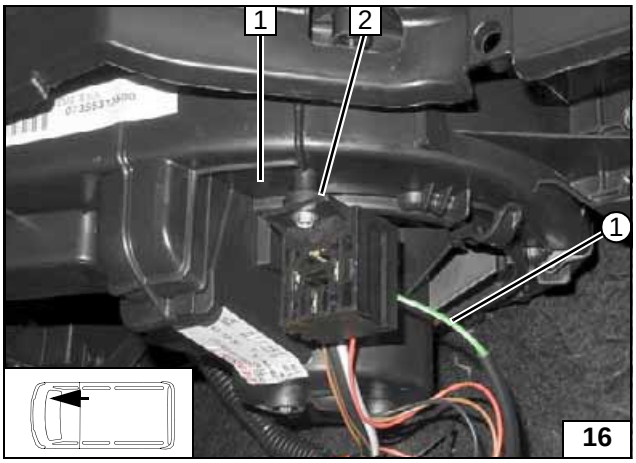


Legend

Webasto components		Vehicle components		Colours and symbols	
HG	TT-C 300 heater	F31	7.5A fuse	rt	red
X1	6-pin heater connector	ZE	Central electrical box	ws	white
X2	2-pin heater connector	GR	Fan relay	sw	black
F1	Fuses 1A	F08	40A fuse	br	brown
F2	Fuse 20	St 01	3-pin, grey connector of ZE	gn	green
F3	25A fuse	F39	10A fuse	bl	blue
X9	Connector of heater controls	F51	7.5A fuse	gr	grey
K3	Fan relay	KB	A/C control panel		
S6	Changeover switch	St A	Connector of KB		
K4	Additional relay	GE	Fan unit	*	up to MY 2010
K5	Electronic relay	St B	6-pin connector of GE	**	MY 2011
PWM GW	Pulse width modulator	**Settings of PWM GW:**		***	from MY 2012
		Duty cycle: 35%		!	Insulate wire end and tie back
		Frequency: 1200Hz			
		Voltage: 4.2V		**X**	Cutting point
		Function: High side		Wiring colours may vary.	

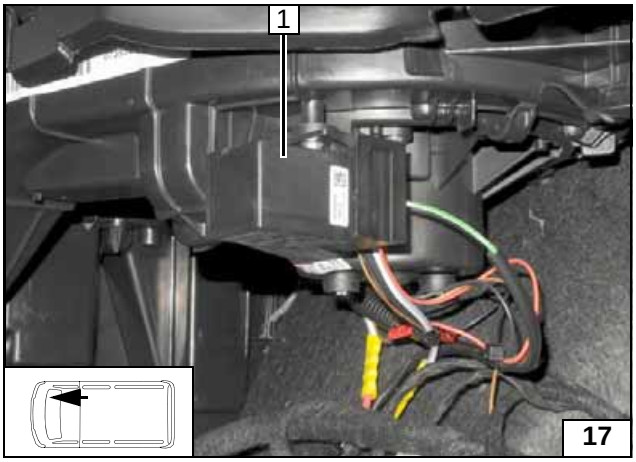
Automatic air-conditioning

Installing PWM GW socket



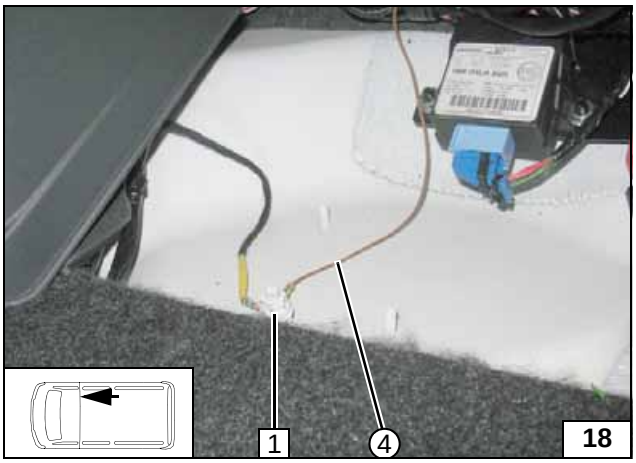
1 Original vehicle bolt of fan motor
2 PWM GW socket
① Green/white (gn/ws) additional wire of K3/86 and PWM GW/SH

Inserting PWM GW



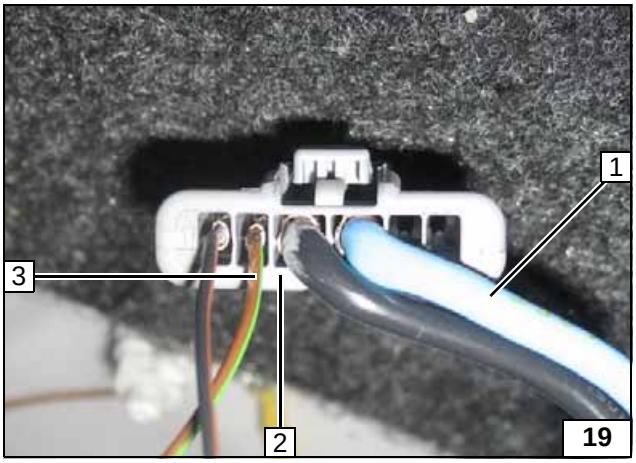
1 PWM GW

Connecting earth wire

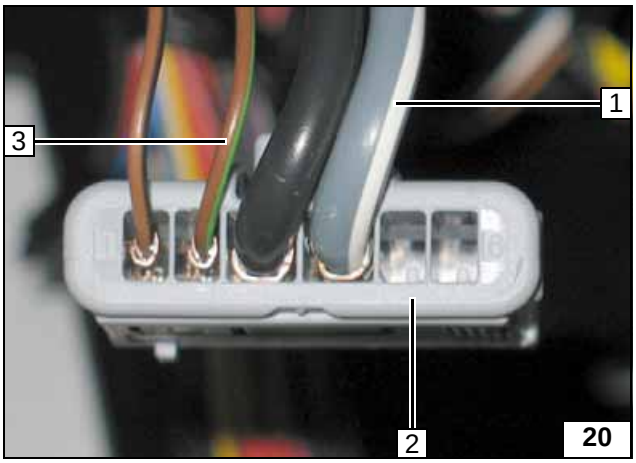


1 Original vehicle earth point
④ Brown (br) wire of PWM GW/GND

View of fan unit connector up to MY 2011

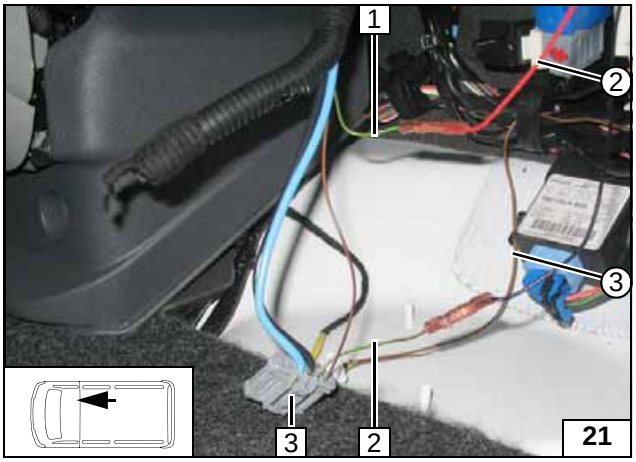


1 Blue (bl) wire of 6-pin GE connector, pin 4
2 6-pin connector of fan controller
3 Brown/green (br/gn) wire of GE connector, pin 2



1 Grey/white (gr/ws) wire of 6-pin GE connector, pin 4
2 6-pin connector of fan controller
3 Brown/green (br/gn) wire of GE connector, pin 2

View of fan unit connector from MY 2012



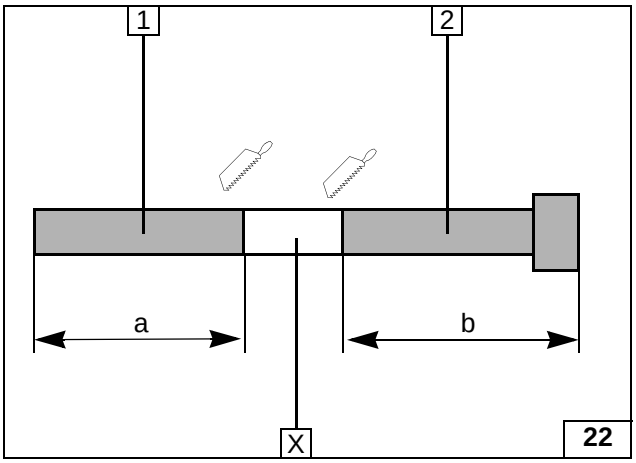
Connection to 6-pin connector **3** from fan controller, pin 2. Produce connections as shown in wiring diagram.

1 Brown/green (br/gn) wire
2 Brown/green (br/gn) wire of 6-pin connector, Pin 2
② Red (rt) wire of PWM GW/IN
③ Black (sw) wire of PWM GW/OUT

Connecting fan controller

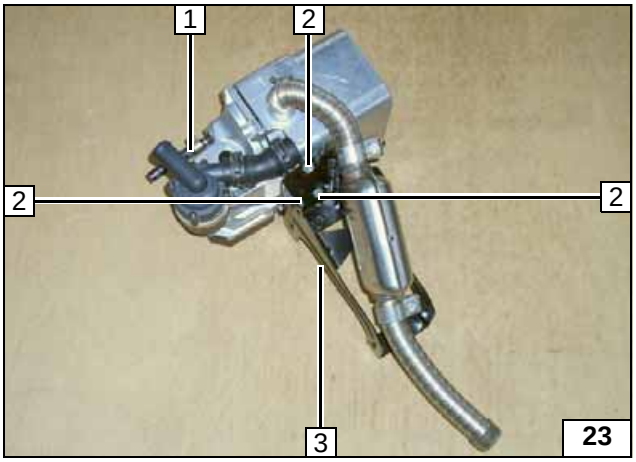
Preparing Heater

Discard section **X**.



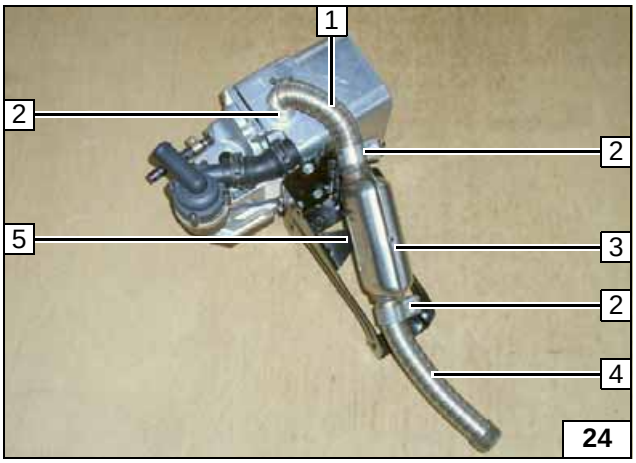
1 Exhaust pipe
a = 140
2 Exhaust end section
b = 160

Preparing exhaust pipe



1 Hose section, 10 mm dia. hose clamp
2 Ejot screw [3x]
3 Bracket

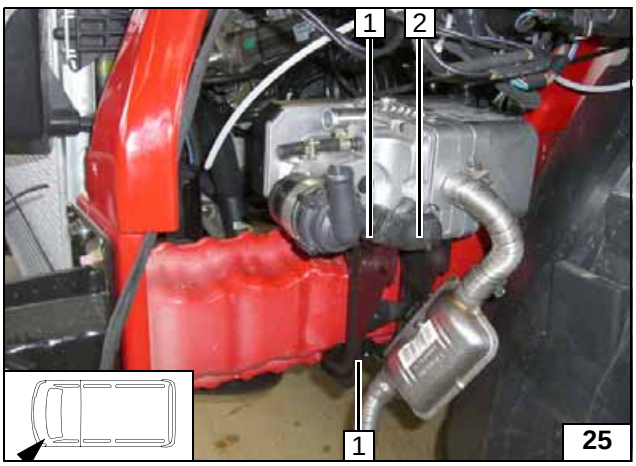
Mounting bracket on heater



1 Exhaust pipe
2 Hose clamp [3x]
3 Exhaust silencer
4 Exhaust-pipe end section
5 Flanged nut

Installing exhaust pipe

Installing Heater



1 Washer, spring lockwasher, nut [2x each], hidden
2 M8x20 bolt, washer, spring lockwasher, hidden

Installing bracket with heater

Fuel up to MY 2010

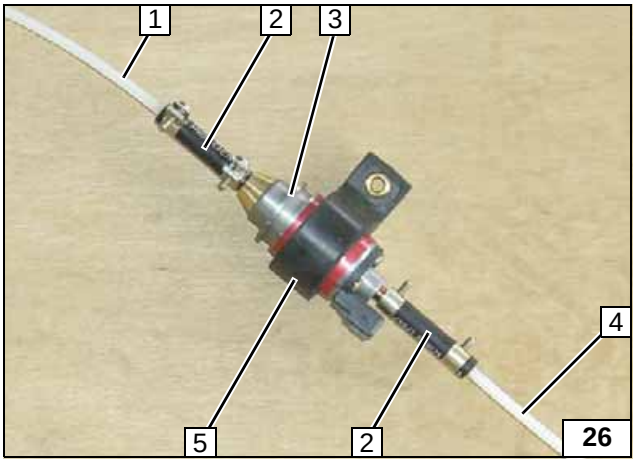
CAUTION!
Open the vehicle's fuel tank cap, ventilate the tank and then re-close the tank lock.

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.

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

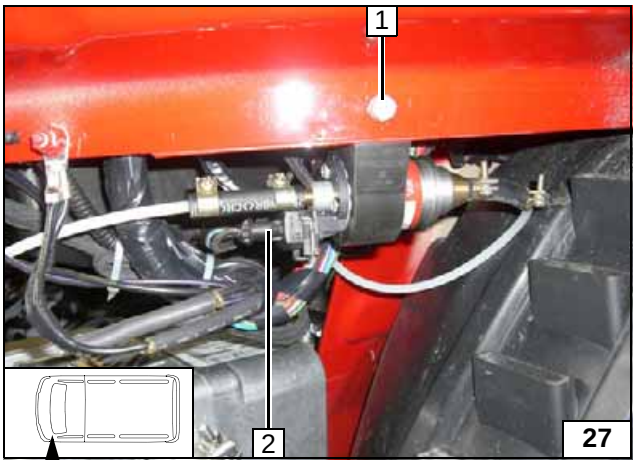
Premounting metering pump



All vehicles

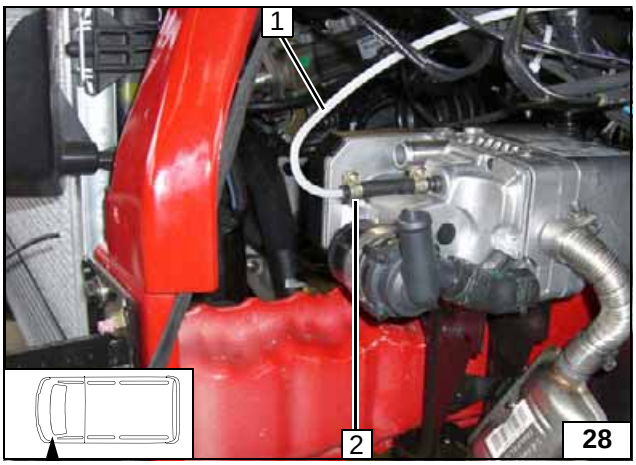
1 800mm long fuel line
2 Hose section [2x], 10mm dia. hose clamp [4x]
3 Metering pump
4 300 mm long fuel line
5 Metering pump mount

Installing metering pump

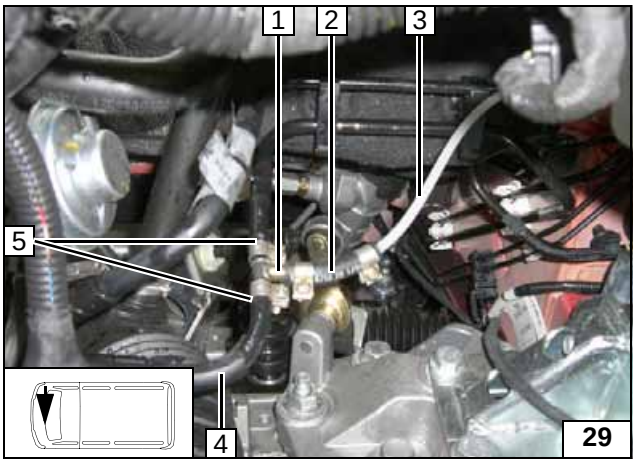


1 7 mm dia. hole, M6x20 bolt, washer, flanged nut
2 Metering pump wiring harness

Connecting heater



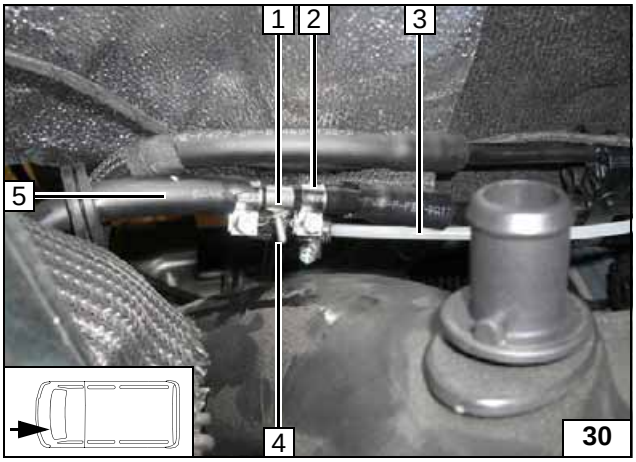
1 Fuel line
2 10 mm dia. hose clamp



Only for 2.3 D

1 8x5x8 fuel standpipe
2 Hose section, 10 mm dia. hose clamp [2x], hose section
3 Fuel line
4 Original vehicle fuel return line
5 10 mm dia. hose clamp

Fuel extraction



Only for 3.0 D

1 8x5x8 fuel standpipe
2 10 mm dia. hose clamp [2x]
3 Fuel line to metering pump
4 90° hose section, 10mm dia. hose clamp [2x]
5 Original vehicle fuel return line

Fuel extraction

Fuel from MY 2011, Euro 5

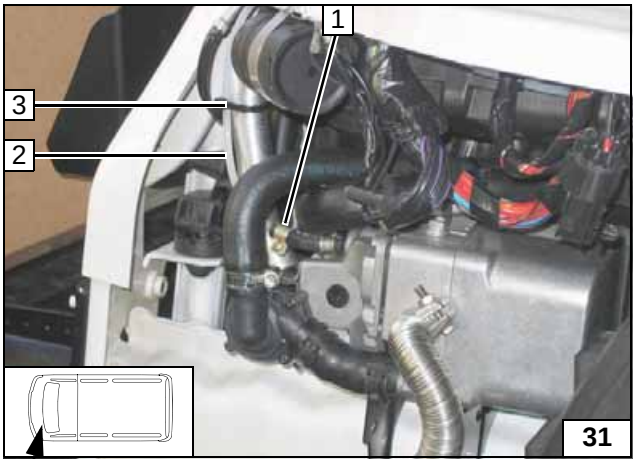
CAUTION!
Open the vehicle's fuel tank cap, ventilate the tank and then re-close the tank lock.

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.

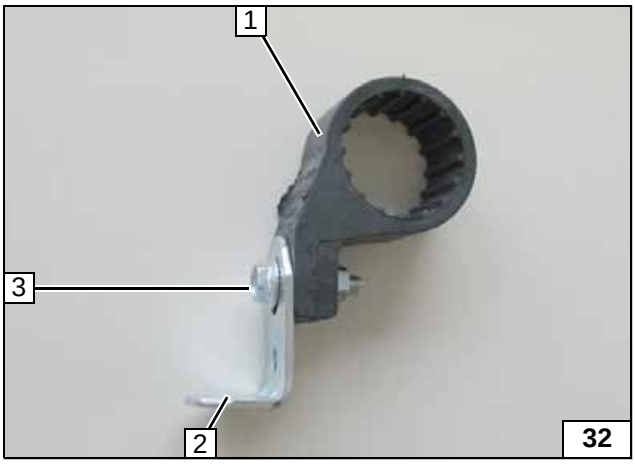
WARNING!
The fuel line and wiring harness are routed to the metering pump as shown in the wiring harness routing diagram.

Connecting heater



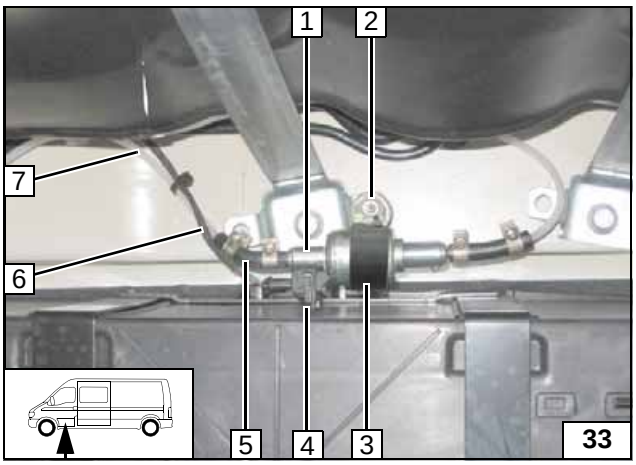
1 10 mm dia. hose clamp
2 Fuel line
3 Cable tie

Preparing metering pump mounting



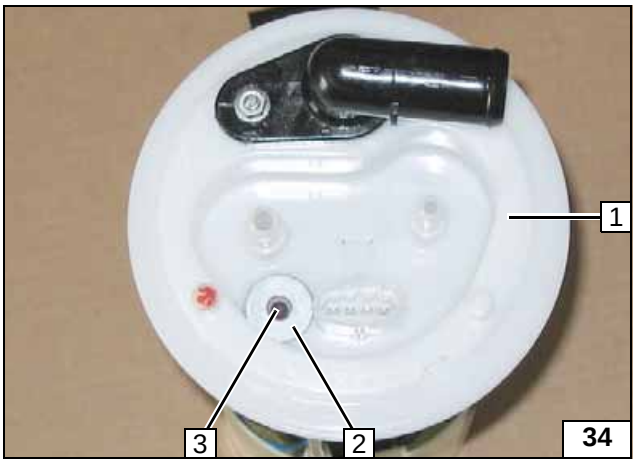
1 Metering pump mount
2 Angle bracket
3 M6x20 bolt, washer, flanged nut

Installing metering pump



Installation location between vehicle fuel tank and battery box.

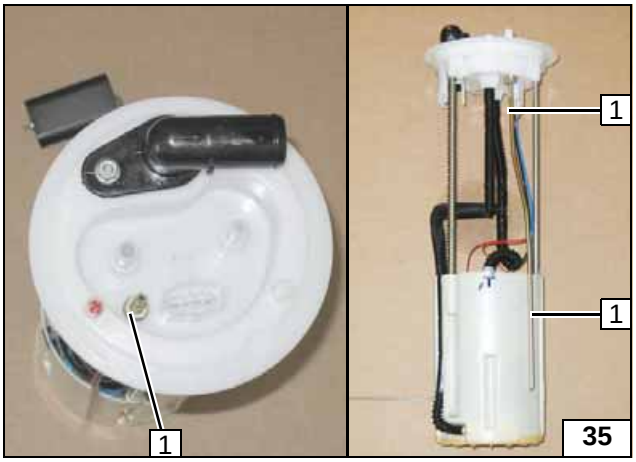
1 Metering pump
2 M6x20 bolt, large diameter washer, flanged nut on existing hole
3 Premounted metering pump bracket
4 Single wire seals, tab connector, connector housing
5 Hose section, 10 mm dia. hose clamps [2x]
6 Metering pump wiring harness
7 Fuel line of heater



Remove fuel tank sending unit **2** in accordance with manufacturer's instructions.

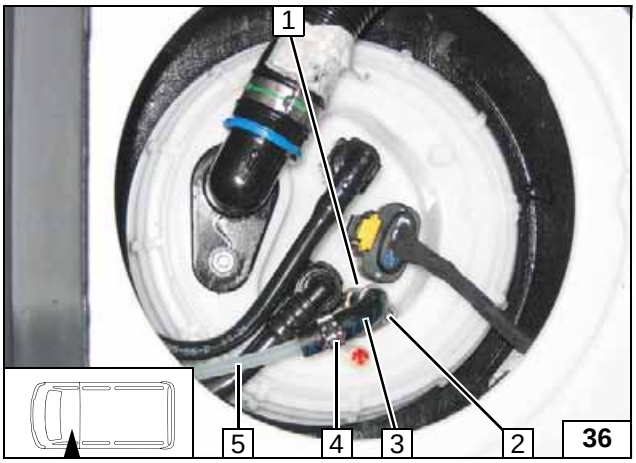
1 Position large diameter washer with outer dia. d_a = 21.6mm.
3 Copy hole pattern, 6mm dia. hole

Fuel extraction



Shape fuel standpipe **1** according to template and cut to length.

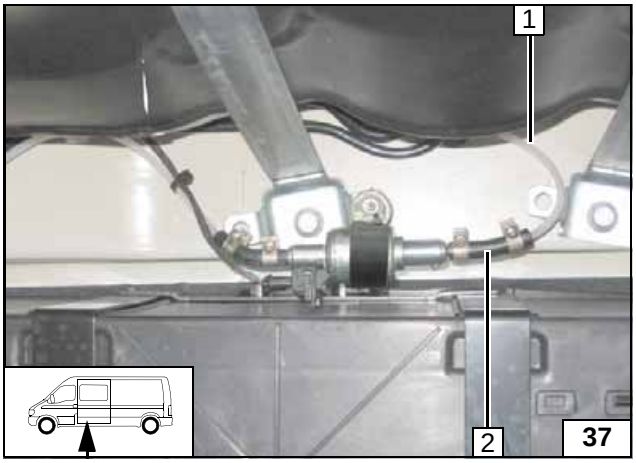
Installing fuel standpipe



Install fuel tank sending unit according to manufacturer's instructions.

1 Fuel standpipe
2 9 mm dia. Caillau clamp
3 90°, 3.5x4.5mm dia. moulded hose
4 10 mm dia. Caillau clamp
5 Fuel line

Connecting fuel line



Fuel line from fuel standpipe **1** on intake side of metering pump [side without connector]. Check the position of the components; adjust if necessary. Check that they have freedom of movement.

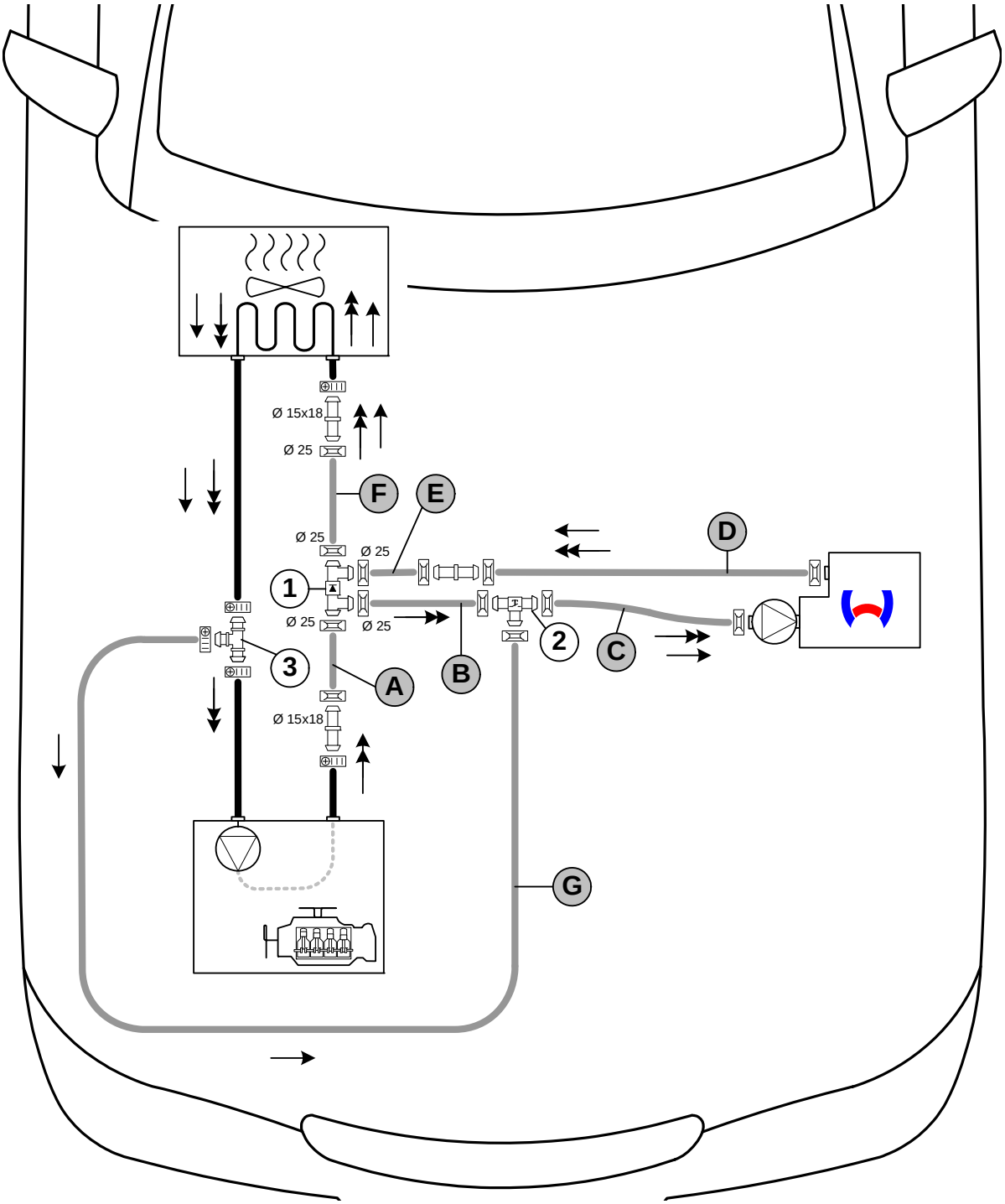
1 Fuel line of fuel standpipe
2 Hose section, 10 mm dia. hose clamp [2x]

Connecting metering pump

Coolant Circuit

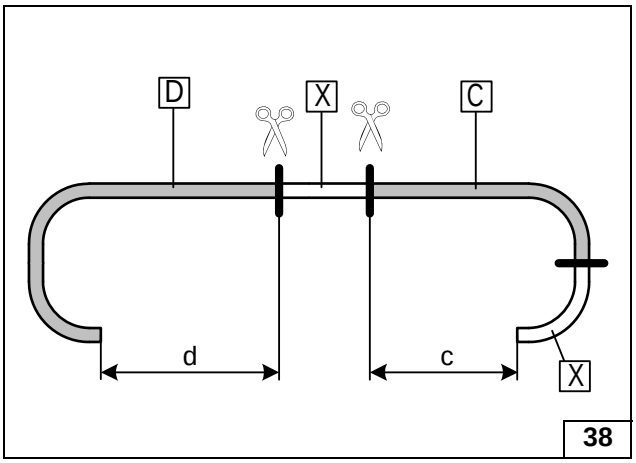
WARNING!
Any coolant running off should be collected in an appropriate container. Route hoses kink-free. Unless specified otherwise, always fasten using cable ties. Position clamps so that other hoses cannot be damaged. The heater must be filled with coolant when installing the hoses.
The connection should be modelled on an 'inline' circuit and based on the following diagram:

Hose routing diagram



All spring clips without a specific designation = 27mm dia. All hose clamps = 20-27 mm dia.
All connecting pipes without a specific designation = 20x20mm dia.
1 = check valve and **2** = thermostat for passenger compartment coolant circuit.

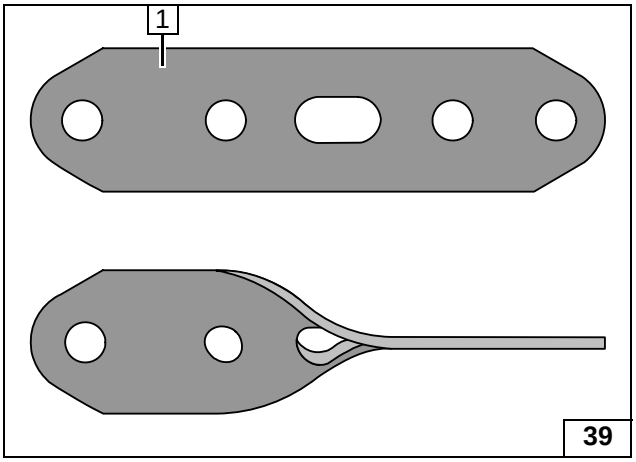
3 = T-piece for engine coolant circuit.



Discard section **X**.

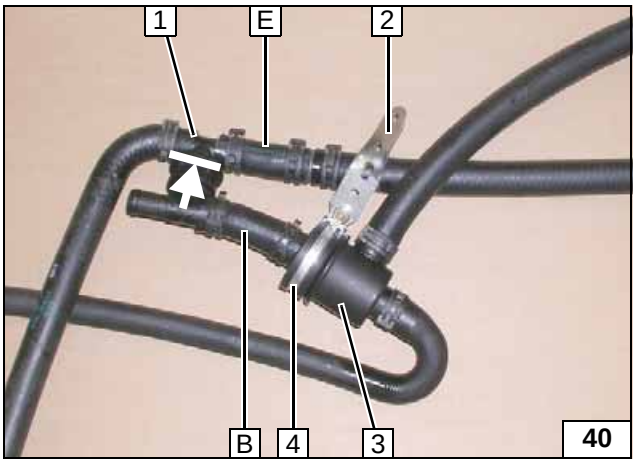
c = 440
d = 400

Cutting hoses to length



Twist perforated bracket **1** in longitudinal direction by 90°.

Preparing perforated bracket

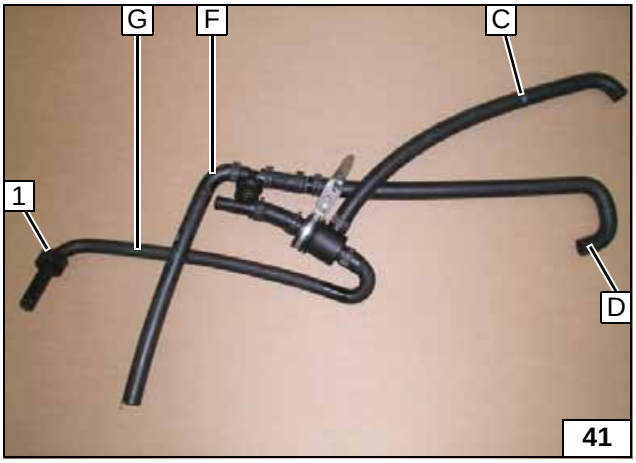


Watch direction of flow of check valve **1**.

B = 20/18 mm dia. moulded hose
E = 20/18 mm dia. moulded hose

2 Perforated bracket
3 Thermostat
4 Rubber-coated p-clamp, M6x20 bolt, washer, flanged nut

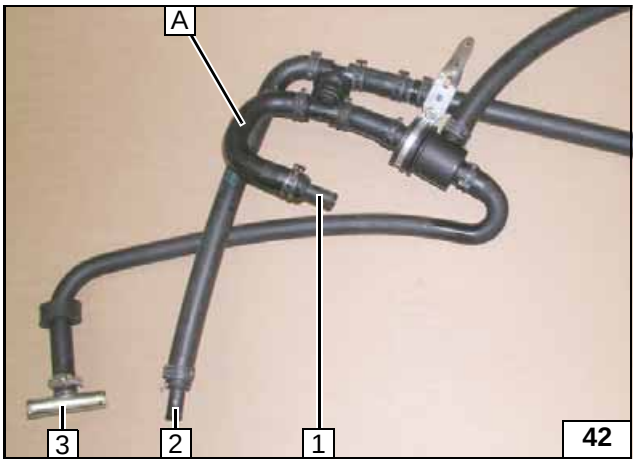
Installation of hose group



F = 90° moulded hose, 350 long (98455B)
G = Moulded hose

1 Black rubber isolator

Installation of hose group

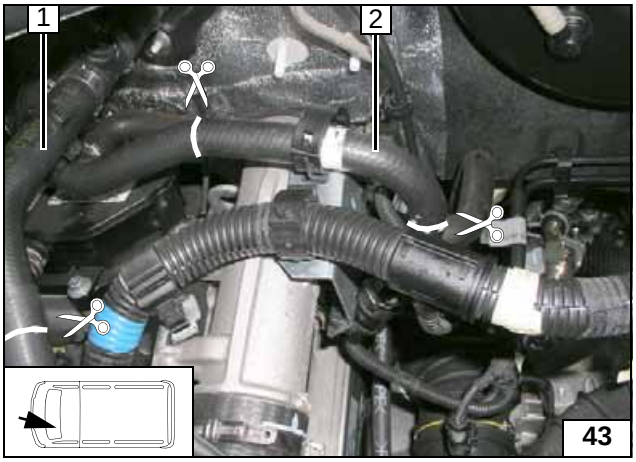


120 Multijet

A = Moulded hose (98454A)

1 18/15 connecting pipe, 25mm dia. spring clip (to engine outlet)
2 18/15 connecting pipe, 25mm dia. spring clip (to heat exchanger inlet)
3 18x15x18 T-piece, 27 mm dia. hose clamp (in return line)

Completing hose group

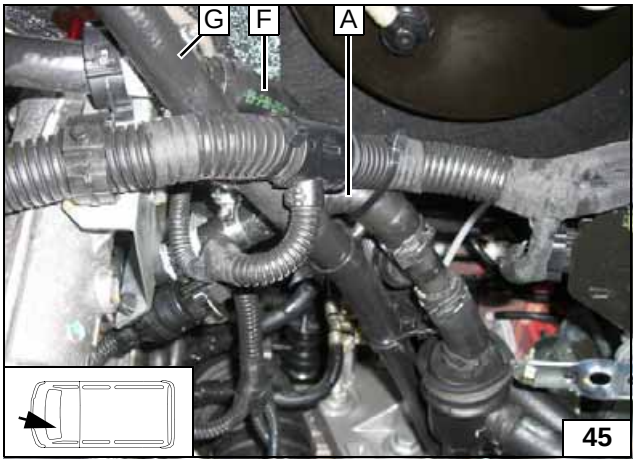


1 Original vehicle fuel return line
2 Original vehicle fuel supply line

Cutting points

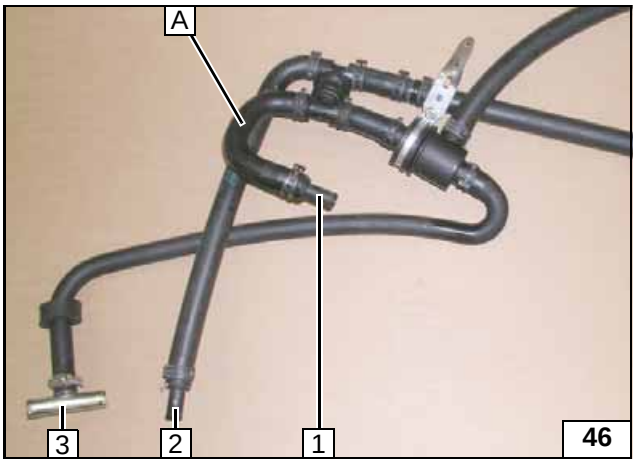
1 Original vehicle stud bolt and flanged nut

Routing in engine compartment



Mount T-piece in original vehicle return hose and secure with hose clamps. Fix hoses with spacer bracket and cable tie.

Connecting heat exchanger

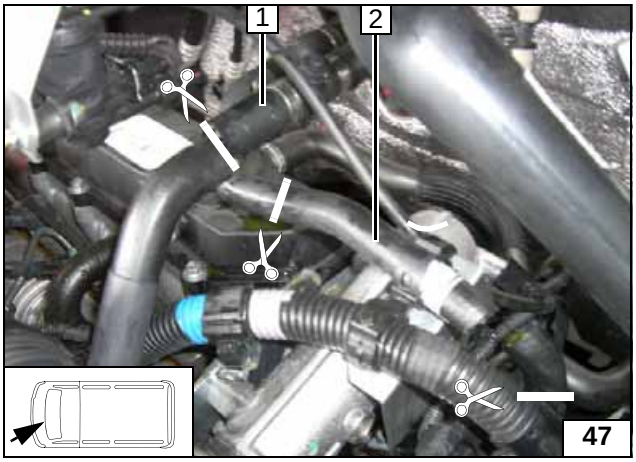


130 and 140 Multijet

A = Moulded hose (98454A)

1 18/15 connecting pipe, 25mm dia. spring clip (to engine outlet)
2 18/15 connecting pipe, 25mm dia. spring clip (to heat exchanger inlet)
3 22x15x22 T-piece, 27 mm dia. hose clamp (in return line)

Completing hose group

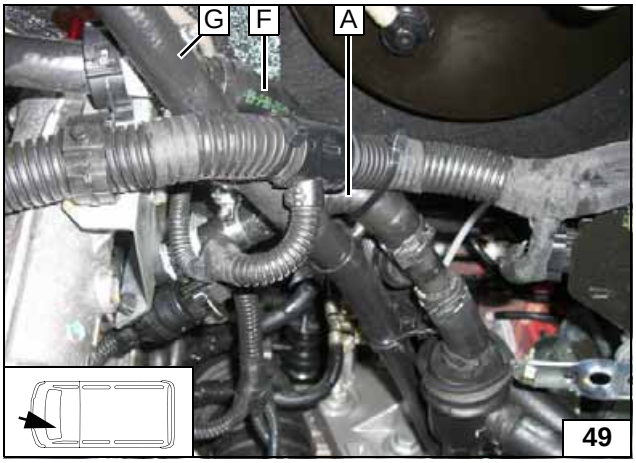


1 Original vehicle fuel return line
2 Original vehicle fuel supply line

Cutting points

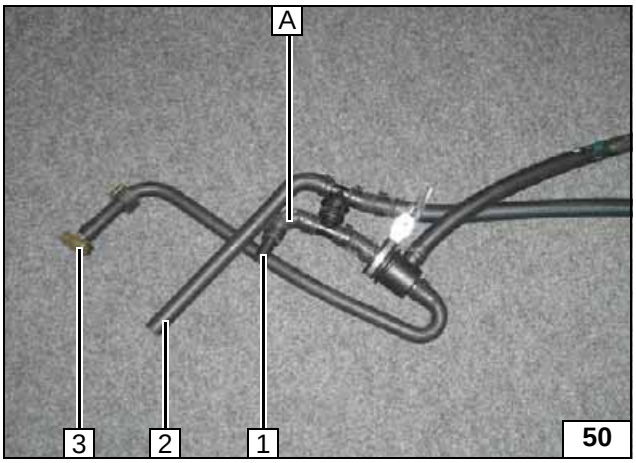
1 Original vehicle stud bolt and flanged nut

Routing in engine compartment



Mount T-piece in original vehicle return hose and secure with hose clamps. Fix hoses with spacer bracket and cable tie.

Connecting heat exchanger

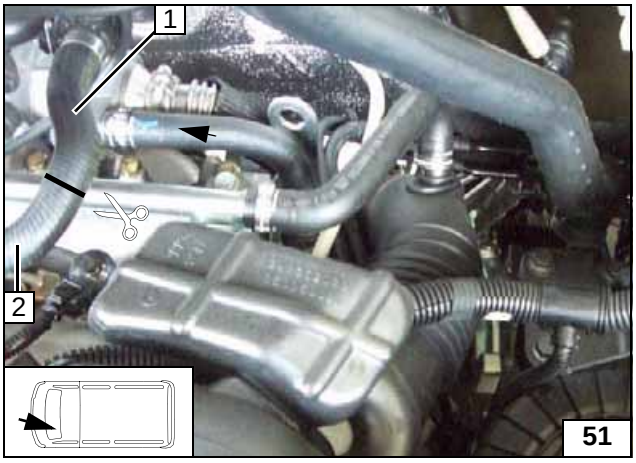


150 and 160 Multijet

A = Cut moulded hose (98454A), 90° elbow to size

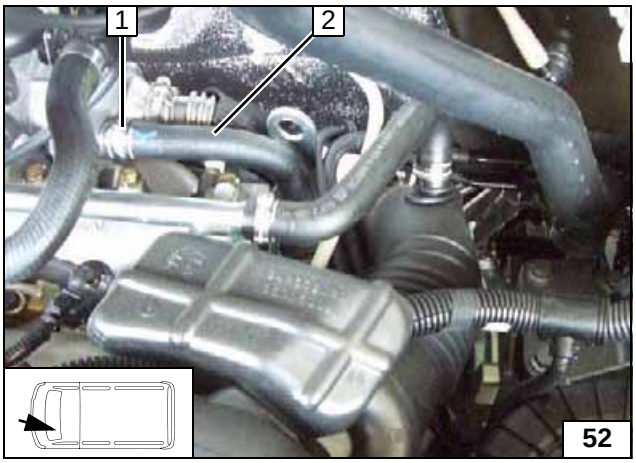
1 18/18 connecting pipe, 25mm dia. spring clip (to engine outlet)
2 Connection to heat exchanger inlet
3 18x15x18 T-piece, 27 mm dia. hose clamp (in return line)

Completing hose group



1 Original vehicle hose of heat exchanger outlet
2 Original vehicle hose of engine inlet

Cutting point

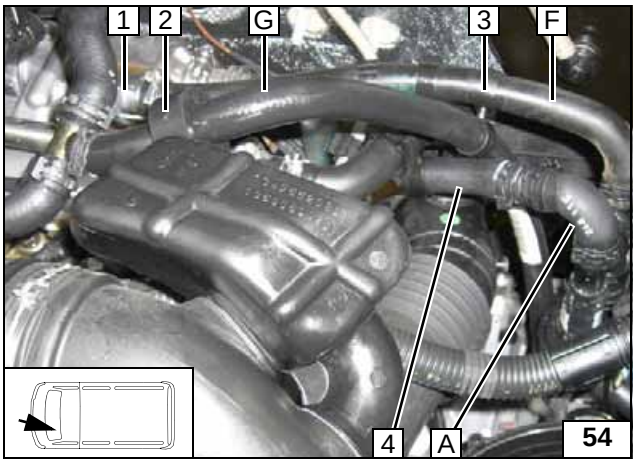


1 Remove original vehicle clamp and re-mount hose after twisting it by 180°
2 Original vehicle hose of engine outlet/heat exchanger inlet

Cutting point

1 Original vehicle stud bolt and flanged nut

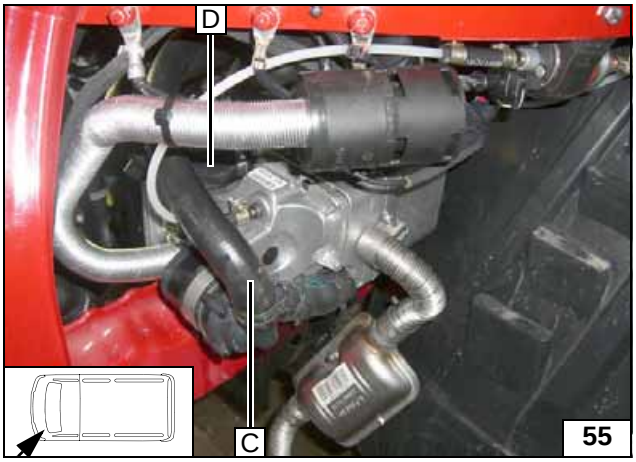
Routing in engine compartment



Mount T-piece in original vehicle return hose and secure with hose clamps.

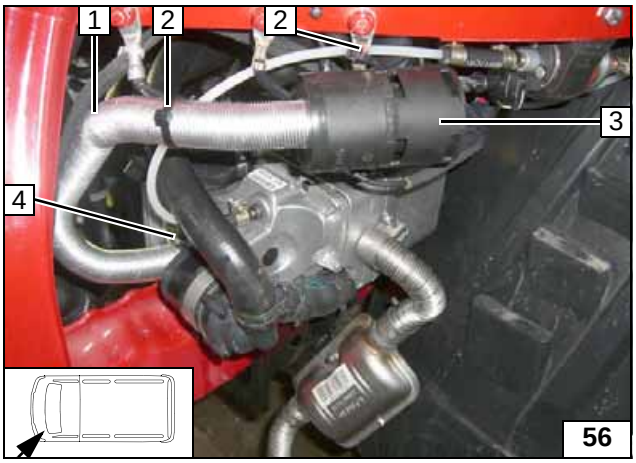
1 Connection of heat exchanger inlet
2 Position black rubber isolator
3 Position spacer bracket
4 Original vehicle hose of engine outlet

Connecting heat exchanger inlet/ outlet and engine outlet



All vehicles

Connecting heater



Combustion Air

1 Combustion air pipe
2 Cable tie [2x]
3 Silencer
4 27 mm dia. hose clamp

Installing combustion air pipe

Final Work

WARNING!
Reassemble the components in reverse order. Check all hoses, clamps and all electrical connections for firm seating. Insulate and tie back all loose lines.
Only use manufacturer-approved coolant. Spray the heater components with anti-corrosion wax (Tectyl 100K, Order No. 111329).

- **Connect the battery.**
- **Fill and bleed the coolant circuit according to the vehicle manufacturer's specifications.**
- **Adjust digital timer, teach Telestart transmitter.**
- **Make settings on A/C control panel according to the 'Operating Instructions for End Customer'.**
- **Place the 'Switch off parking heater before refuelling' caution label near the filler neck.**
- **For initial startup and function check, please see installation instructions.**

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http://dealers.webasto.com

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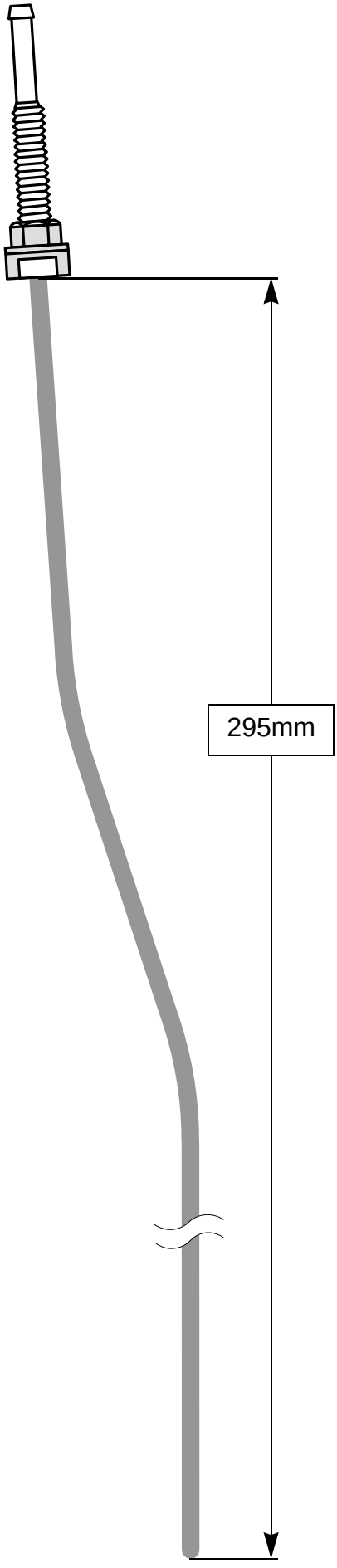
Fuel Standpipe Template

Watch length!
Shown cut in straight section!



100mm

Scale 1:1

Compare size of printout with dimension lines.
Allowed tolerance a maximum of 2%.

Set the printer settings to 'no margin' or 'minimise margins' and 100% of the normal size.

100mm

0

 © Webasto Thermo & Comfort SE

Operating Instructions for End Customer

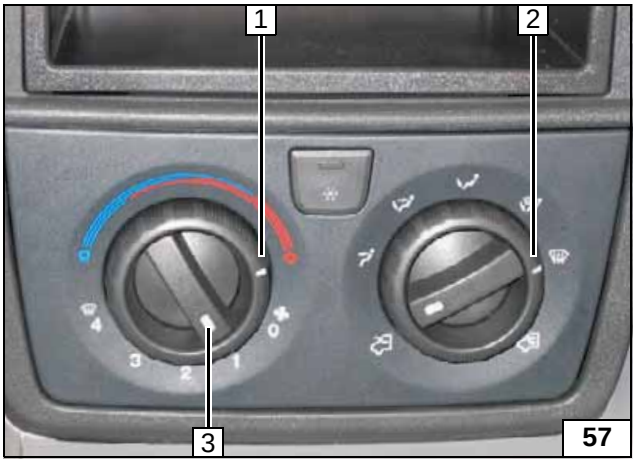
Please remove page and add to the vehicle operating instructions.

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.

Passenger compartment monitoring, if installed, must be deactivated in addition to the vehicle settings for the heating operation.
For instructions on deactivation, please refer to the operating instructions of the vehicle.

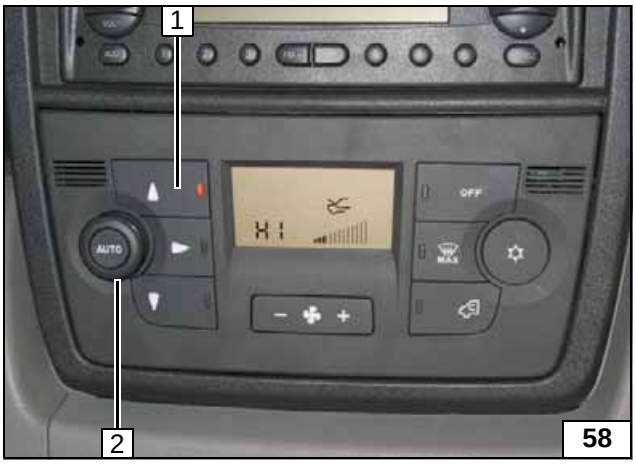
Before parking the vehicle, make the following settings:

Manual A/C



1 Set temperature to ‘max.’
2 Air outlet to windscreen
3 Set fan to level ‘1’, or possibly ‘2’

Automatic air-conditioning



The fan speed need not be preset!

1 Air outlet to windscreen
2 Set temperature to ‘HI’