

# Installation Instructions

Air heaters

Air Top Evo 40 | Air Top Evo 55



English

# Contents

<b>1</b>	<b>About this document</b>	<b>4</b>	<b>6</b>	<b>Combustion air system</b>	<b>16</b>
1.1	Purpose of the document	4	6.1	Open end of combustion air intake line	16
1.2	Using this document	4	6.2	Combustion air intake line	16
1.3	Use of symbols and highlighting	4			
1.4	Warranty and liability	4	<b>7</b>	<b>Exhaust system</b>	<b>17</b>
			7.1	Information on exhaust system on ADR vehicles	17
<b>2</b>	<b>Safety</b>	<b>5</b>	7.2	Exhaust gas outlet	17
2.1	Intended use	5	7.3	Exhaust line	17
2.2	Qualifications of installation personnel	5	7.4	Exhaust silencer	18
2.3	Regulations and legal requirements	5			
2.4	Safety information	5	<b>8</b>	<b>Electrical connection</b>	<b>19</b>
			8.1	Information on the electrical connection	19
<b>3</b>	<b>Heater</b>	<b>6</b>	8.2	Connecting heater	19
3.1	Installation example	6	8.3	Connecting control element	19
3.2	Installation location requirements:	7	8.4	Connecting heater to ADR vehicles	19
3.3	Heater dimensions	8			
3.4	Installation position	9	<b>9</b>	<b>Installation as system with two heaters</b>	<b>20</b>
3.5	Installing heater	9	9.1	Information on system layout	20
			9.2	System layout	20
<b>4</b>	<b>Cold and hot air system</b>	<b>10</b>	9.3	Installing the system	20
4.1	Information on cold and hot air system	10			
4.2	Cold air inlet and hot air outlet	10	<b>10</b>	<b>Initial operation</b>	<b>21</b>
4.3	Cold and hot air ducts	10	10.1	Information on initial operation	21
4.4	External temperature sensor	11	10.2	Checking operation with Webasto Thermo Test PC Diagnosis	21
			10.3	Starting up	21
<b>5</b>	<b>Fuel supply</b>	<b>12</b>	10.4	Starting up system with two units	21
5.1	Information on fuel supply	12	10.5	Product registration	21
5.2	Removing fuel at vehicle's fuel supply and return pipe	12			
5.3	Removing fuel from vehicle fuel tank	12	<b>11</b>	<b>Troubleshooting</b>	<b>22</b>
5.4	Removing fuel from separate fuel tank	13	11.1	Error code output	22
5.5	Fuel line	13			
5.6	Fuel pump	14			
5.7	Fuel filter	14			
5.8	Sticker	15			

<b>12</b>	<b>Technical data</b>	<b>23</b>
12.1	Heater	23
<b>13</b>	<b>Annex</b>	<b>24</b>
13.1	Drilling template: heater	24
13.2	Legends to the wiring diagrams	25
13.3	Wiring diagrams	27

# 1 About this document

## 1.1 Purpose of the document

These installation instructions are an integral part of the product and contain all the information required to ensure correct and safe installation.

## 1.2 Using this document

- ▶ Before installing the unit, read the installation instructions and the supplementary information "Important notes on the operating and installation instructions".
- ▶ Read the operating instructions before operating the unit.

## 1.3 Use of symbols and highlighting



### DANGER

#### Type and source of danger

Disregard can result in death.

- ▶ Actions to protect yourself against risks.



### WARNING

#### Type and source of danger

Result: non-observance can lead to severe or mortal injuries.

Actions to protect yourself against risks.



### CAUTION

#### Type and source of danger

Result: non-observance leads to minor injuries.

Actions to protect yourself against risks.



### ATTENTION

#### Type and source of danger

Result: non-observance leads to property damage.

Actions to protect yourself against risks.



Further information can be found in following documents:



Note on a special technical feature

## 1.4 Warranty and liability

Webasto shall not assume liability for defects or damage that are the result of the installation and operating instructions being disregarded.

This liability exclusion particularly applies for:

- installation by untrained personnel
- improper use
- repairs not carried out by a Webasto service workshop
- use of non-original spare parts
- conversion of the unit without permission from Webasto

Highlight	Explanation
✓	Requirements for the following necessary action
▶	Necessary action

## 2 Safety

### 2.1 Intended use

The heater is approved for installation in vehicles. The heater is suitable for heating, e.g.:

- cabins
- equipment
- cargo areas

The heater is not approved for the purpose of directly heating the cargo area of ADR vehicles (hazardous substance transportation).

### 2.2 Qualifications of installation personnel

The installation personnel must have the following qualifications:

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

### 2.3 Regulations and legal requirements

- Regulations on the supplementary sheet "Important notes on the operating and installation instructions" must be observed.

### 2.4 Safety information

#### Safety information on installation

Danger posed by live parts

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

Risk of fire or toxic gasses by incorrect installation

- ▶ Protect vehicle components in the vicinity of the heater from overheating by implementing the following measures:
  - Maintain minimum safety distances.
  - Ensure adequate ventilation.
  - Use fire-resistant materials or heat shields.
- ▶ Always comply with legal requirements.
- ▶ Installation of heater in ADR vehicles: Comply with ADR guidelines.

Danger of lacerations on sharp edges

- ▶ Fit protectors on sharp edges.

#### Safety information on operation

Risk of explosion in environments with combustible vapours, flammable dust and hazardous goods (e.g. petrol stations, tank facilities, fuel store, coal bunkers, timber yard or grain warehouses)

- ▶ Do not switch on or operate the heater.

Risk of poisoning and suffocation from exhaust fumes in closed rooms without exhaust gas extraction

- ▶ Do not switch on or operate the heater.

Risk of fires from flammable substances in the hot air flow

- ▶ Keep hot air outlet clear.
- ▶ Remove flammable substances from the hot air flow.

#### Avoiding damage to property

Overheating caused by restricted cold air inlet and hot air outlet

- ▶ Keep the cold air inlet and hot air outlet clear of dirt and objects.

The overheating of heater

- ▶ Do not operate heater without control unit cover in place.

Incorrect handling

- ▶ Protect the unit against mechanical stress (e.g. dropping, impacts or knocks).
- ▶ Do not place heavy objects on top of the unit.
- ▶ Do not step on the unit.

Shutting down the heater while afterrunning.

The heater continues running for approx. 240 seconds after being switched off via the control element.

- ▶ Always switch off the heater via the control element.
- ▶ Do not disconnect from the voltage supply before the afterrunning period has elapsed.
- ▶ If a battery disconnecter or kill switch is fitted: Shut down the heater via the battery disconnecter or kill switch only in the case of emergency.

Cables damaged on sharp edges can cause short-circuits

- ▶ Fit protectors on sharp edges.

# 3 Heater

## 3.1 Installation example

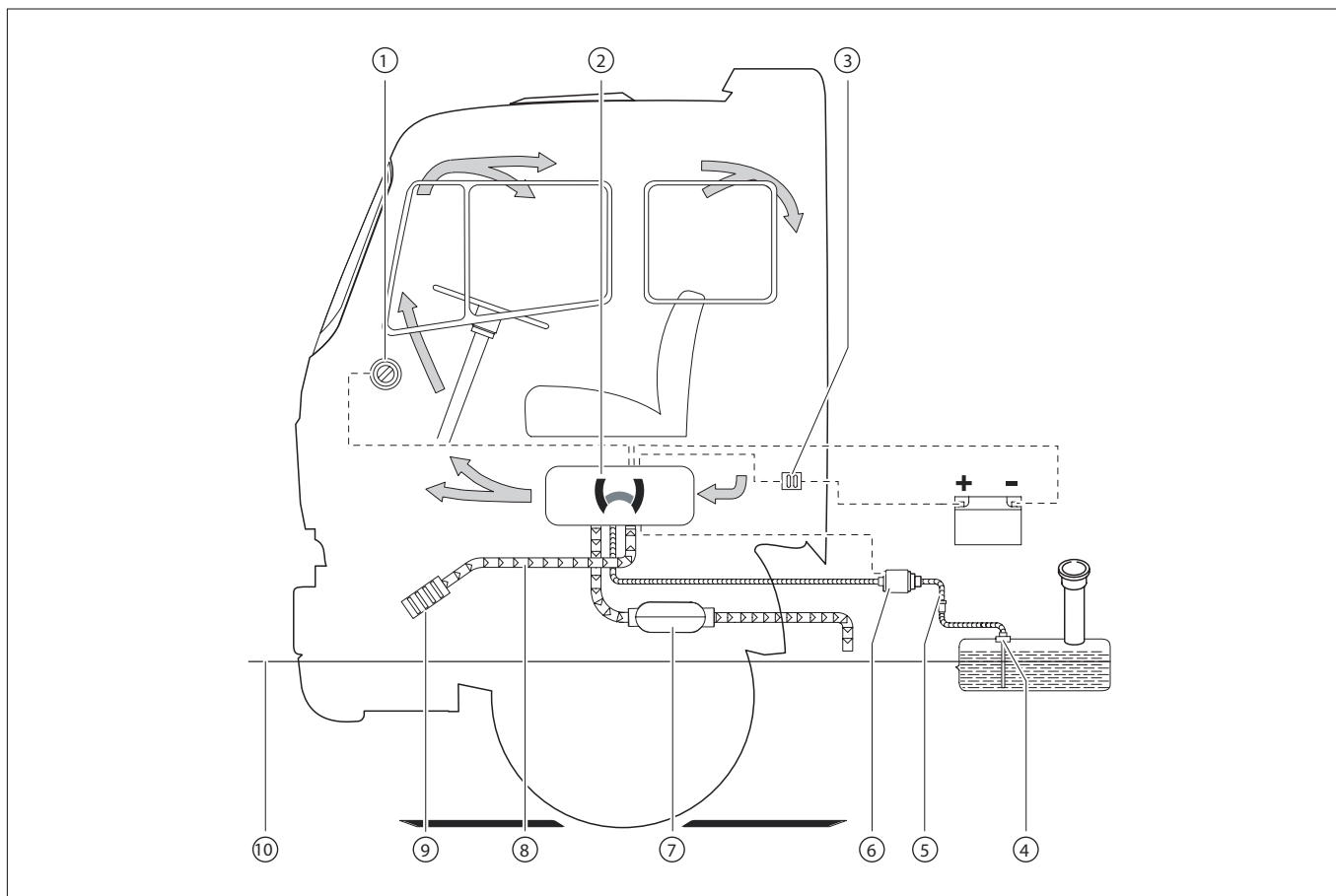


Fig. 01: Installation example (installation conditions dependent on vehicle type)

- |                           |  |
|---------------------------|--|
| 1 Control element         | 6 Fuel pump                                  |
| 2 Heater                  | 7 Exhaust silencer (accessory)               |
| 3 Fuse                    | 8 Combustion air intake line                 |
| 4 Fuel standpipe          | 9 Combustion air intake silencer (accessory) |
| 5 Fuel filter (accessory) | 10 Maximum permissible fording level         |

## 3.2 Installation location requirements:

The heater can be installed both on the exterior and interior.

### Installation on exterior

The installation location must satisfy the following requirements:

- There is sufficient space for the unit (see „3.3 Heater dimensions“).
- The installation location is protected from mechanical damage.
- The installation location is protected from splash water and water spray wherever possible.
- The installation location is above the maximum permissible fording level of the vehicle.
- The combustion air inlet and exhaust gas outlet are separate (to avoid exhaust crossover).

### Installation on interior

The installation location must satisfy the following requirements:

- There is sufficient space for the unit (see „3.3 Heater dimensions“).
- The connections for the combustion air system and the exhaust system are completely on the outside.
- The installation location is protected from mechanical damage.
- Persons cannot come in contact with hot surfaces. Install contact guard if necessary.
- Heat-sensitive parts are protected from high temperatures. Install heat shield if necessary.





### 3.4 Installation position

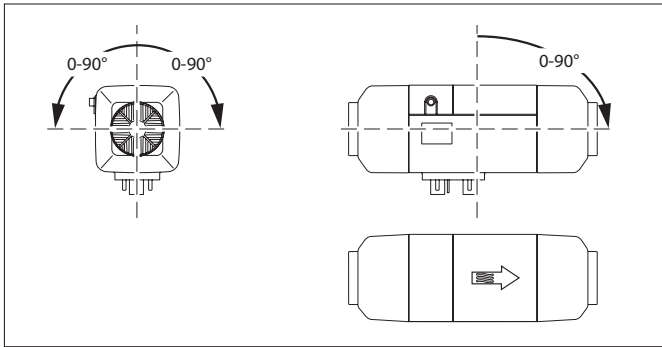


Fig. 03: Permissible installation position of diesel heater

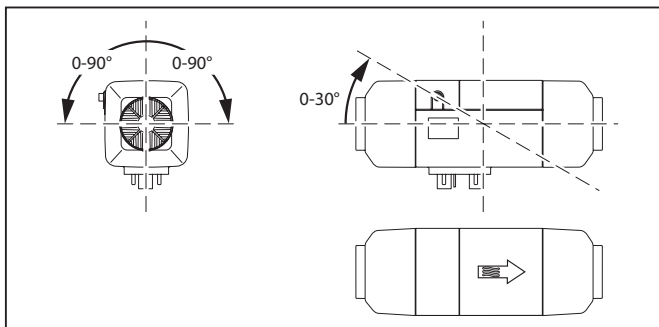


Fig. 04: Permissible installation position of petrol heater

### 3.5 Installing heater



#### WARNING

#### Exhaust fumes

Poisoning and suffocation

- ▶ Make sure that the casing rests only on the base after installation.
- ▶ Make sure that the base seal is fitted correctly.
- ▶ Make sure that the exhaust gasses are routed only to the outside.



The support surface for the heater base must be flat. The base seal compensates for unevenness of up to 1 mm.

- ▶ Make sure that the installation location satisfies the requirements.
- ▶ Ensure the correct installation position.
- ▶ Comply with vehicle manufacturer's instructions.
- ▶ Unevenness >1 mm: Flatten out support surface.
- ▶ Drill holes with the aid of the drilling template (see „13 Annex“).

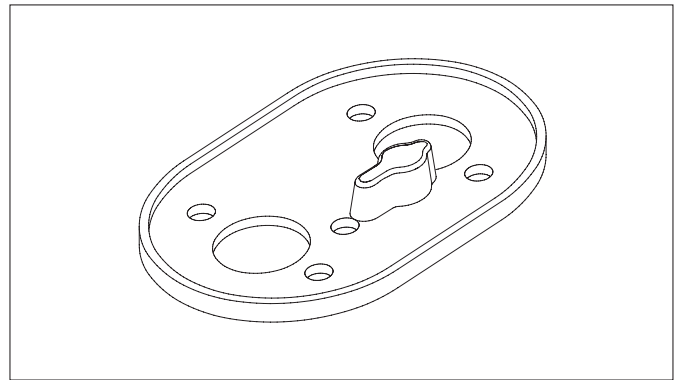


Fig. 05: Base seal for heater

- ▶ Fit base seal between heater and support surface.
- ▶ Except for the year of installation, remove all the year numerals on the type label and type label duplicate.
- ▶ Secure heater at base with M6 nuts.
- ▶ Tighten nuts to a torque of 6 Nm.
- ▶ Make sure that the heater rests only on the base.

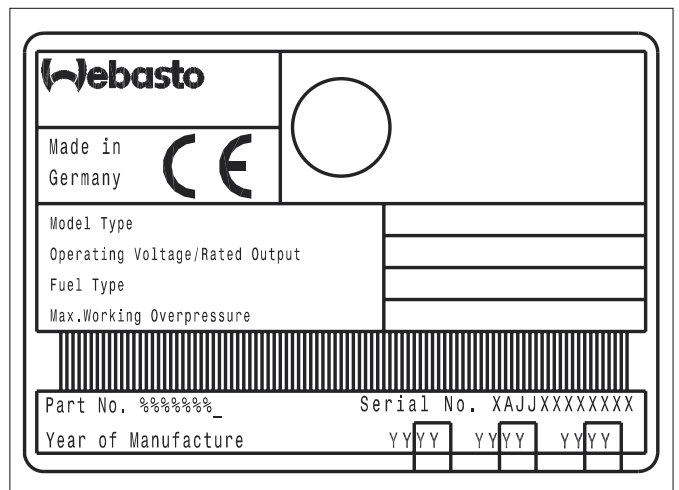


Fig. 06: Example of rating plate duplicate

- ▶ If the type label is not visible after installing the heater: Secure the type label duplicate such that it is clearly visible in a protected area on the vehicle.

## 4 Cold and hot air system

### 4.1 Information on cold and hot air system

- ▶ Do not connect the cold and hot air system of the heater to the externally controlled air routing systems (e.g. vehicle air conditioning system).

#### Recirculated air mode and fresh air mode

The cold air can be drawn in from the outside (fresh air mode) or inside (recirculated air mode).

#### Temperature control

The heater regulates the heating capacity depending on the temperature of the cold air intake and the temperature set on the control element.



For fresh air mode, an external temperature sensor must be installed in the area to be heated.

#### Permissible pressure loss in the cold and hot air system



The pressure loss in the cold and hot air system must be below the specified limits (see „12 Technical data“).

The heating capacity will be reduced if the limits are exceeded.

### 4.2 Cold air inlet and hot air outlet



#### CAUTION

##### Risk of burn injuries due to insufficient distance between hot air outlet and persons

Burn injuries

- ▶ Make sure that persons cannot come in contact with hot surfaces.
- ▶ Make sure persons are protected from the direct hot air flow from the heater.



#### ATTENTION

##### Reduced output by drawing in hot air

Fault in heating operation

- ▶ Install cold air inlet such that the hot air from the heater or the hot air from the vehicle heating system is not drawn in directly.

#### Installation location requirements:

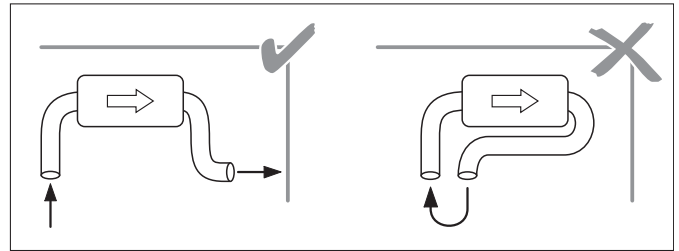


Fig. 07: Avoid air crossover between cold air inlet and hot air outlet

The installation location for the cold air inlet must satisfy following requirements:

- Hot air is not drawn in from the vehicle's heating system.
- Hot air is not drawn in from the heater.
- Exhaust gas is not drawn in.
- The installation location is protected from splash water and water spray.
- The installation location is above the maximum permissible fording level of the vehicle.

The installation location for the hot air outlet must satisfy following requirements:

- Persons cannot come in contact with hot surfaces.
- Persons are protected from the direct hot air flow from the heater.
- Heat-sensitive parts are protected from the direct hot air flow.

### 4.3 Cold and hot air ducts

#### Requirements relating to the hot air duct

Parameter	Value
Thermal endurance	min. 130 °C (short-term min. 150 °C)
Recommended inside diameter of main hot air duct	
Air Top Evo 40	80 mm
Air Top Evo 55	90 mm

- ▶ Install cold and hot air ducts with minimal resistance to flow.

#### Installing cold and hot air ducts



#### CAUTION

##### Risk of injury by rotating fan wheel

Lacerations

- ▶ If no cold air duct is used: Install mesh guard over intake.

- ▶ Make sure that the installation location satisfies the requirements.
- ▶ Make sure that the hot air duct satisfies the requirements.
- ▶ Make sure the cold air inlet, hot air outlet as well as the cold and hot air ducting are installed in the correct position.
- ▶ Drill holes.
- ▶ Secure cold and hot air ducts at all connections.

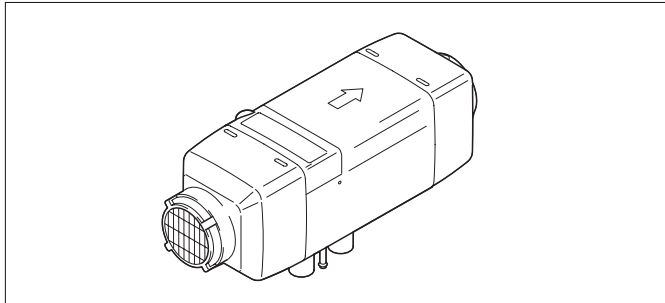


Fig. 08: Cold air inlet with mesh guard

- ▶ Installing heater in casing:
  - Provide a cross section area of at least 50 cm<sup>2</sup> for the cold air inlet.
  - Seal off the hot air outlet such that no hot air can enter the casing.

#### 4.4 External temperature sensor

For fresh air mode, an external temperature sensor must be installed in the area to be heated.

##### **Installation location requirements:**

The installation location must satisfy the following requirements:

- The installation location is at mid-level of the area to be heated.
- The installation location is outside the hot air flow.
- The installation location is outside the range of other heat sources (e.g. vehicle heating system).
- The installation location is not in direct sunlight (e.g. not on the dashboard).
- The air can circulate unhindered (e.g. not covered by curtains).

# 5 Fuel supply

## 5.1 Information on fuel supply

The fuel can be taken off at the following points:

- Fuel supply or return pipe on vehicle engine
- Vehicle fuel tank
- Separate fuel tank

The fuel line consists of an intake and pressure side:

- Intake side: Connection between fuel tank and fuel pump
- Pressure side: Connection between fuel pump and heater

### Permissible pressure at fuel take-off point

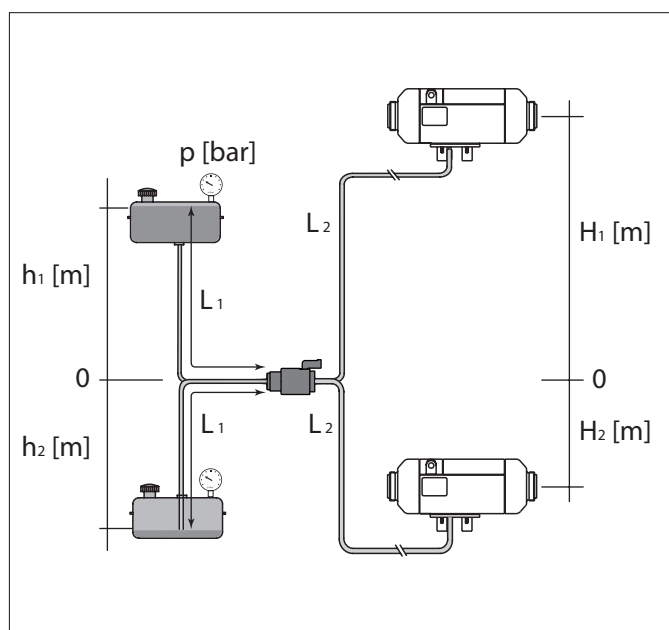


Fig. 09: Permissible pressure at fuel take-off point

Parameter	Value
Inside diameter of fuel line	2 mm
$L_1$	Length of fuel line (intake side) max. 5 m
$L_2$	Length of fuel line (pressure side) max. 10 m
$L_1 + L_2$	Total length of fuel line max. 12 m
$H_1$	Height difference between heater and fuel pump (heater above fuel pump) max. 3 m
$H_2$	Height difference between heater and fuel pump (heater below fuel pump) max. 1 m

Fuel level (tank above fuel pump), $h_1$ [m]	Maximum permissible fuel pressure at take-off point, $p$ [bar]
$h_1 = 0$	-0.1 to +0.5
$h_1 = 0$ to 1	-0.1 to +0.4
$h_1 = 1$ to 2	-0.1 to +0.3

Fuel level (tank below fuel pump), $h_2$ [m]	Maximum permissible fuel pressure at take-off point, $p$ [bar]
$h_2 = 0$ to 1.3	-0.1 to +0.5

## 5.2 Removing fuel at vehicle's fuel supply and return pipe

### Installation location requirements:

The installation location must satisfy the following requirements:

- The pressure at the fuel take-off point is within the permissible range.

### Installing fuel extractor

- ▶ Use only the genuine Webasto fuel extractor.
- ▶ Make sure that the installation location satisfies the requirements.
- ▶ Fuel take-off from return pipe:
  - Make sure that the return pipe is not closed off by a non-return valve.
  - Make sure that the return pipe extends to the base of the fuel tank.
- ▶ Fuel take-off from swirl pot:
  - Make sure that the swirl pot is not completely emptied.

## 5.3 Removing fuel from vehicle fuel tank

The Webasto fuel extractor can be installed on the fuel delivery unit.



### CAUTION

**Risk of fire by fuel escaping from leaking fuel tank**

Skin burns

- ▶ Do not drill into fuel tank.
- ▶ When retrofitting the fuel take-off system on a plastic tank: Install the Webasto fuel extractor only on the vehicle's fuel delivery unit.

## Installing Webasto fuel extractor on fuel delivery unit

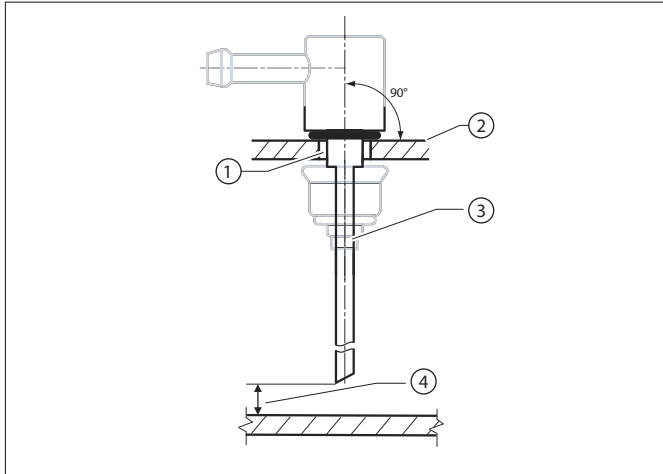


Fig. 10: Installation position of Webasto fuel extractor

1 Webasto fuel extractor

2 Section of vehicle's fuel delivery unit with hole

3 Intake pipe of Webasto fuel extractor

4 Minimum distance 10 mm

- ▶ Make sure that the intake pipe of the Webasto fuel extractor cannot impair operation of the vehicle's fuel delivery unit with fuel gauge in any operating mode.
- ▶
- ▶ Make sure that the mounting surface for the Webasto fuel extractor is flat and free of burrs.
- ▶ Clean mounting surface of Webasto fuel extractor.
- ▶ In installed position: Maintain a minimum distance of 10 mm between the intake pipe and base of the fuel tank or a minimum distance of 20 mm above the base of the fuel delivery unit.
- ▶ Observe the safety measures specified by the vehicle manufacturer.
- ▶ Observe the tightening torque requirements specified by the vehicle manufacturer.

## 5.4 Removing fuel from separate fuel tank

- ▶ Do not install the fuel filler neck in the vehicle interior.
- ▶ Only use a fuel tank that can be closed off with a filler cap.
- ▶ Clearly mark the type of fuel to be used on the fuel filler neck.

## 5.5 Fuel line

### Requirements relating to fuel lines



Use only steel or plastic fuel lines made from light and temperature-resistant PA12/ETFE, PA12/EFEP, PA9T/PA12 in accordance with DIN 73378.

- ▶ Use Webasto-approved fuel lines and genuine Webasto connectors.
- ▶ Internal diameter: 2 mm

### Connecting fuel lines

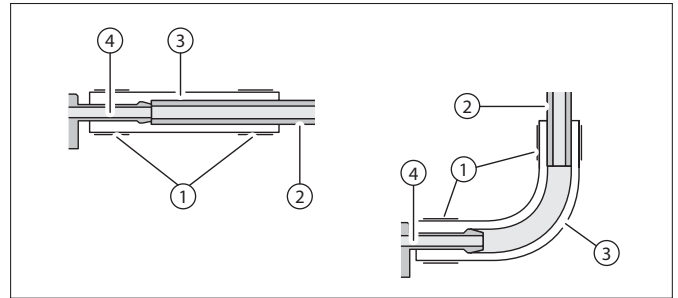


Fig. 11: Connections with hose and hose clips

1 Hose clip

2 Fuel line

3 Hose

4 VDA connector

- ▶ Make sure that the connections are tight.

### Installing fuel lines



Malfunctions caused by gas bubbles and high fuel temperatures. Gas bubbles caused by the heat from the engine and high fuel temperatures can cause malfunctions during operation.

- ▶ Install fuel lines in cool areas.



Webasto recommends using the Webasto Thermo Test PC Diagnosis to fill the fuel lines before connecting to the heater.

- ▶ Keep line lengths as short as possible.
- ▶ Avoid the fuel lines sagging.
- ▶ Secure the fuel lines.
- ▶ Protect the fuel lines from damage:
  - Install stone impact guard.
  - Fit protectors on sharp edges.
- ▶ Protect fuel lines from high temperatures (e.g. from exhaust pipe):
  - Install heat shield if necessary.
  - Do not install fuel lines in areas where heat builds up.
- ▶ Make sure the fuel lines are not damaged.

## 5.6 Fuel pump



### ATTENTION

#### Malfunctions caused by corroded plug connections

Corroded plug connections can cause a malfunction between the fuel pump and wiring harness.

- ▶ Use only genuine Webasto plug connections.



### ATTENTION

#### Damage to fuel pump

- ▶ Operate the fuel pump only via the Webasto Thermo Test PC Diagnosis.
- ▶ Do not operate the fuel pump with the vehicle voltage.



#### Operating the heater with any other than the DP42 fuel pump will invalidate the warranty and approval!

- ▶ Operate the heater only with the DP42 fuel pump.

The fuel pump is a combined delivery, metering and a shut-off system.

#### Installation location requirements:

The installation location must satisfy the following requirements:

- The installation location is close to the fuel tank in order to keep the intake fuel line as short as possible.
- The installation location is protected from stone impact.
- The installation location is protected from high temperatures.

## Fuel pump installation position

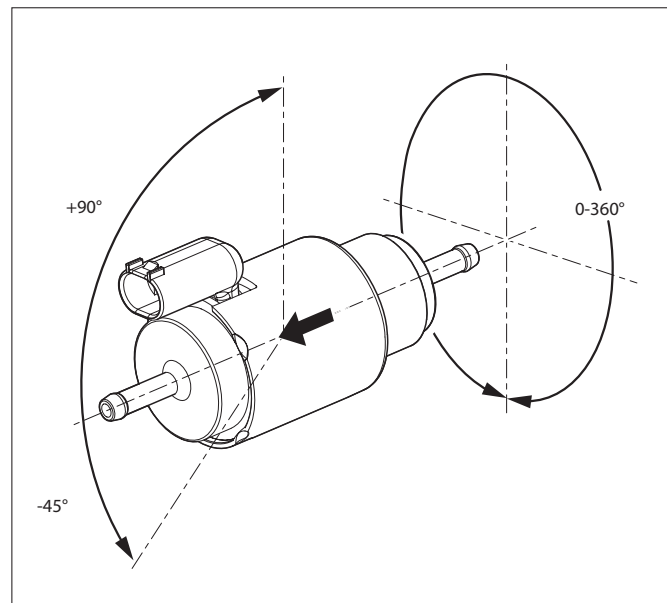


Fig. 12: Installation position of DP42 fuel pump and direction of flow

## Installing fuel pump

- ▶ Make sure that the installation location satisfies the requirements.
- ▶ Ensure the correct installation position.
- ▶ Pay attention to the direction of flow of the fuel. The end with the connector is always the outlet end.
- ▶ Secure the fuel pump with a vibration-damping mount (e.g. rubberised Webasto clip).
- ▶ Connect fuel pump and wiring harness.
- ▶ Secure fuel pump to vehicle.



A heat shield can be installed to protect against short-term overheating and radiated heat.

## 5.7 Fuel filter



- ▶ If dirty fuel might be expected: Install a Webasto fuel filter.
- ▶ Enter fuel filter in the vehicle's service booklet.

## Installation position of fuel filter



Webasto recommends installing the fuel filter in vertical position. Vertical installation improves bleeding of the fuel filter.

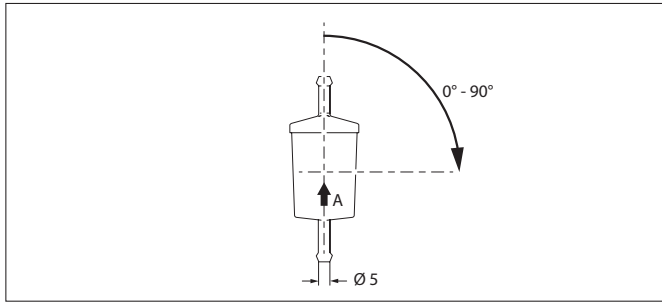


Fig. 13: Installation position of fuel filter

### Installing fuel filter

- Ensure the correct installation position. Pay attention to the direction of flow of the fuel (arrow).

## 5.8 Sticker

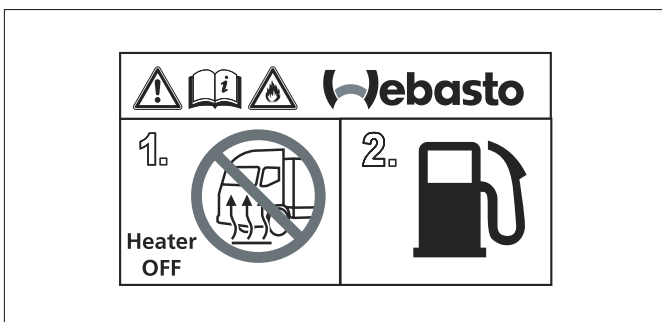


Fig. 14: Sticker "Switch Off Heater Before Refuelling"

- Affix the sticker "Switch Off Heater Before Refuelling" (included in scope of delivery) in area of fuel filler neck.

## 6 Combustion air system

### 6.1 Open end of combustion air intake line

#### Installation position

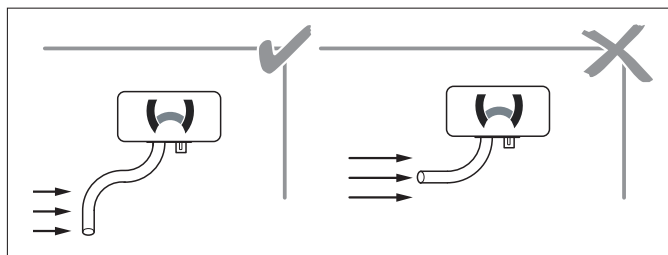


Fig. 15: Install open end of combustion air intake line 90° to direction of travel

- ▶ Install open end of combustion air intake line 90° to direction of travel.

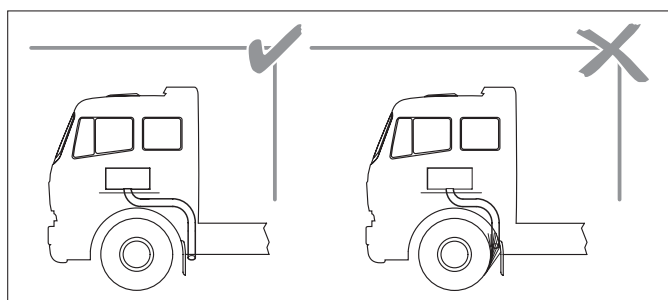


Fig. 16: Avoid dirt

- ▶ Install the combustion air intake line such that the open end of the line is protected from dirt.

#### Installation location requirements:



#### WARNING

#### Reduced oxygen levels due to incorrectly positioned combustion air intake opening

Unconsciousness and risk of suffocation due to lack of oxygen

- ▶ Do not take combustion air from enclosed areas used by people.

The installation location must satisfy the following requirements:

- ▶ The combustion air is taken from the outside.
- ▶ The exhaust gasses or fuel vapours are not drawn in.
- ▶ Cool air is drawn in.
- ▶ The installation location is above the maximum permissible fording level of the vehicle.

### 6.2 Combustion air intake line



#### ATTENTION

#### Damage caused by confusing the exhaust line with the combustion air intake line

Damage to fuel pump cable caused by sharp end of pipe

- ▶ Connect exhaust line only to the exhaust outlet coupling.

#### Installing combustion air intake line

- ▶ Use only Webasto-approved combustion air intake lines.
- ▶ Maintain the following limits:

Parameter	Value
Max. length of combustion air intake line with integrated silencer and without exhaust silencer	5 m
Max. length of combustion air intake line with integrated silencer and with exhaust silencer	2 m
Max. length of combustion air intake line with external silencer and without exhaust silencer	5 m
Recommended min. length of combustion air intake line with integrated silencer	0.5 m
Min. length of combustion air intake line with external silencer	The external combustion air intake silencer can be connected directly to the heater. The combustion air intake line serves as a connection piece.
Internal diameter	25 mm
Smallest bending radius	50 mm
Max. sum of all bends	270°

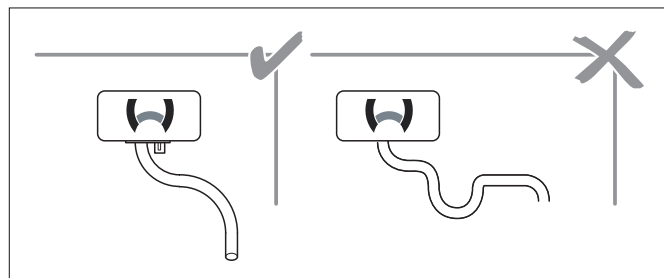


Fig. 17: Avoid syphon (risk of condensation accumulation)

- ▶ Install combustion air intake line rising to the heater.
- ▶ If combustion air intake line cannot be installed continually rising:
  - Make a condensation drain hole (Ø 4 mm) at the lowest point of the syphon.
  - Make sure that no exhaust gasses are drawn in.



# 7 Exhaust system

## 7.1 Information on exhaust system on ADR vehicles

- ▶ Install the exhaust system such as to avoid overheating or ignition of the hazardous material.
- ▶ Maintain minimum distance between exhaust system and fuel tank. Comply with guidelines for ADR vehicles.

## 7.2 Exhaust gas outlet

### Installation position

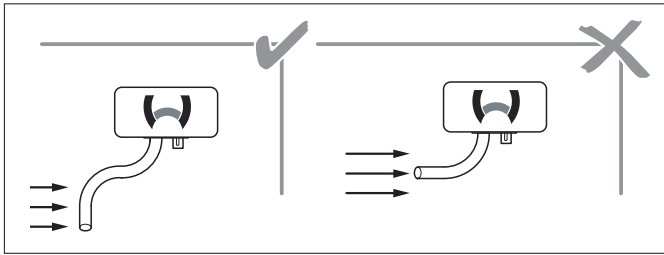


Fig. 18: Do not install the exhaust gas outlet opposite direction of travel

- ▶ Install exhaust gas outlet such that the exhaust gasses do not flow out opposite the direction of travel.

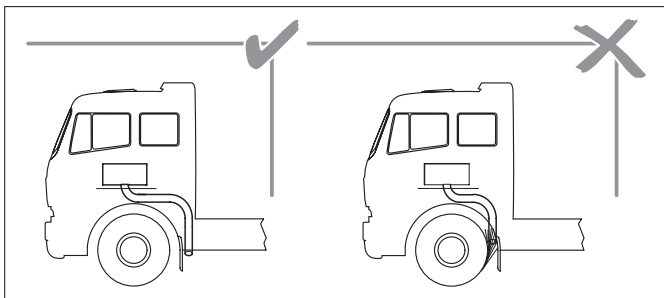


Fig. 19: Avoid dirt

- ▶ Install the exhaust line such that the exhaust gas outlet is protected from dirt.

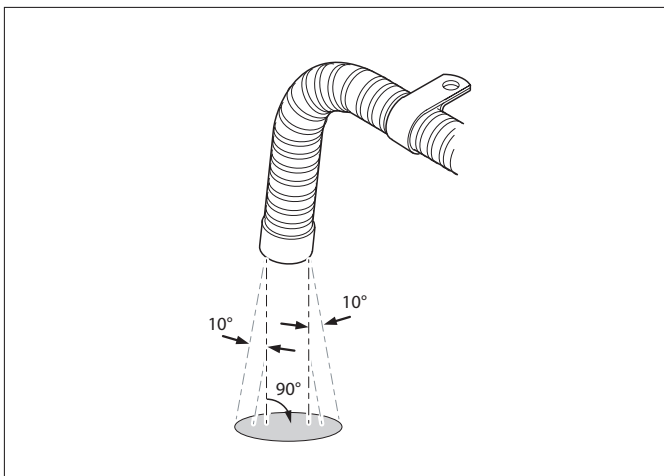


Fig. 20: Installation position of exhaust gas outlet

- ▶ Secure the exhaust line maximum 150 mm from the exhaust gas outlet so that the exhaust gasses emerge at an angle of 90° ±10° to the ground.

### Installation location requirements:



#### WARNING

##### Exhaust fumes

Poisoning and suffocation

- ▶ Make sure that the exhaust gasses are not routed through the interior.



#### WARNING

##### Fire risk due to hot exhaust gasses

Injuries or damage to property caused by fire

- ▶ Do not direct the exhaust gas outlet towards highly flammable or heat-sensitive parts.

The installation location must satisfy the following requirements:

- The installation location is selected such that exhaust gasses cannot enter the vehicle interior (e.g. openings, ventilation equipment).
- The exhaust gasses can flow out unhindered.
- The exhaust gas outlet is not directed towards highly flammable or heat-sensitive parts.

## 7.3 Exhaust line



Do not route the exhaust line through the vehicle interior.

### Installing exhaust line

- ▶ Maintain the following limits:

Parameter	Value
Internal diameter	24 mm
Material	Non-corroding
Minimum length	0.5 m
Smallest bending radius	50 mm
Max. sum of all bends	270°

- ▶ Do not secure the exhaust line to heat-sensitive parts (e.g. brake lines, electrical cables).
- ▶ Maintain adequate distance from heat-sensitive parts. A heat shield can be fitted.

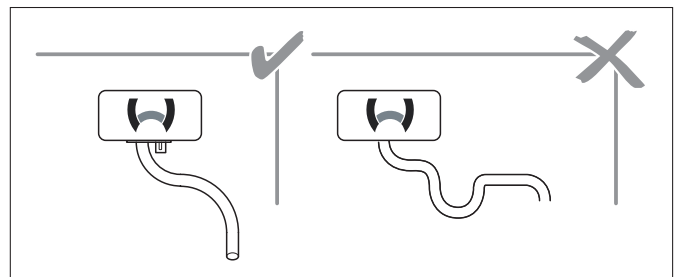


Fig. 21: Avoid syphon (risk of condensation accumulation)

- ▶ Install exhaust line continually falling from heater so that condensation can drain off.
- ▶ If exhaust line cannot be installed continually falling:

- Make a condensation drain hole (Ø 4 mm) at the lowest point of the syphon.
- Make sure that the condensation drain hole does not point towards heat-sensitive parts.
- ▶ Use suitable insulation material to avoid dropping below the dew point.
- ▶ Maintain maximum length of exhaust line (see „12 Technical data“).

## 7.4 Exhaust silencer

Webasto recommends installing an exhaust silencer to reduce noise.

### Installation position

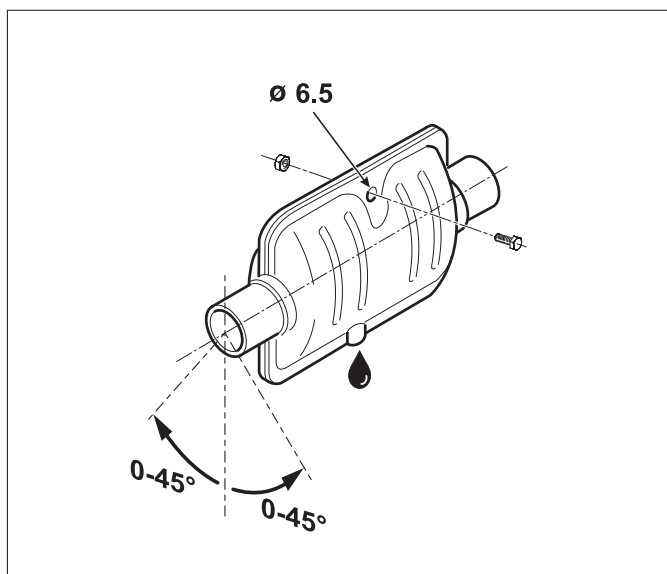


Fig. 22: Installation position of exhaust silencer

Any direction of flow.

### Installation location requirements:

The installation location must satisfy the following requirements:

- The installation location is as close as possible to the heater.

### Installing exhaust silencer

- ▶ Ensure the correct installation position.
- ▶ Do not secure the exhaust silencer to heat-sensitive parts (e.g. brake lines, electrical cables).
- ▶ Maintain adequate distance from heat-sensitive parts. A heat shield can be fitted.
- ▶ Install exhaust silencer such that condensation can drain off through the condensation drain hole in the exhaust silencer.

## 8 Electrical connection

### 8.1 Information on the electrical connection

- ▶ Insulate ends of lines that are not required.



Operate the heater only with the integrated setpoint sensor.

### 8.2 Connecting heater



After it is switched off the heater continues running. The voltage supply must not be disconnected before approx. 240 seconds have elapsed.

An electrical battery disconnecter or relay can be connected in accordance with the wiring diagram.

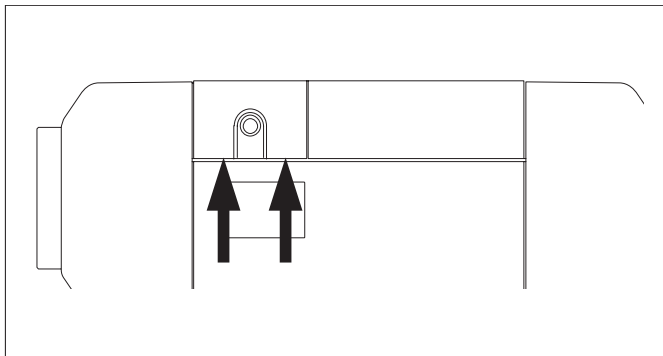


Fig. 23: Removing control unit cover

- ▶ Use a blunt blade on both sides to remove the control unit cover.
- ▶ Plug in wiring harness connector at control unit.
- ▶ Route cable through left or right cable lead-through.
- ▶ Position cable grommet such that the cable lead-through is sealed off in the control unit cover.
- ▶ Connect the supply voltage to the vehicle electrical system.
- ▶ Install fuse holder in vehicle interior.
- ▶ Install a fuse (according to SAE J 1284, F= 15 A for 24 V, F= 20 A for 12 V) with fuse holder as a safety measure for the heater.
- ▶ Connect heater corresponding to the wiring diagram.
- ▶ Replace control unit cover.

### 8.3 Connecting control element

- ▶ Drill holes according to the control element installation instructions.
- ▶ Connect plug to control element according to the labelling on the heater wiring harness.



You will find further information in the installation instructions for the control element.

### 8.4 Connecting heater to ADR vehicles

#### Connecting heater

- ▶ Connect heater corresponding to the wiring diagram.



After connecting in accordance with the ADR wiring diagram, the heater will continue running for 40 seconds when switch S5 is operated.

#### Connecting control element



ADR vehicles: The heater must only be switched on manually via a switch. It must not be possible to switch on the heater automatically via a programmable switch.

## 9 Installation as system with two heaters

### 9.1 Information on system layout

The system layout is not approved for ADR vehicles.

### 9.2 System layout

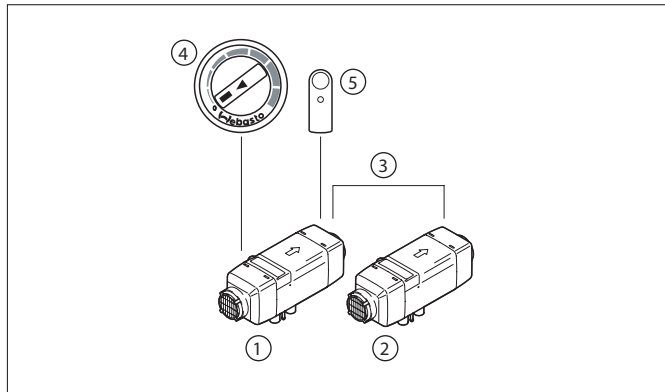


Fig. 24: System layout

- 1 Master heater
- 2 Slave heater
- 3 Master to slave wiring harness
- 4 Control element
- 5 External temperature sensor

Two heaters can be connected together to form a system. The heater, to which the control element and the external temperature sensor are connected, is automatically recognised as the master heater. The other unit is the slave heater. The heaters communicate via a serial bus system.

### 9.3 Installing the system

- ▶ Install heaters as described in the installation instructions.
- ▶ Make electrical connections at the master heater and slave heater corresponding to the wiring diagram (see „13 Annex“).
- ▶ Connect the control element to the master heater.
- ▶ Connect the external temperature sensor to the master heater.
- ▶ Switch on voltage supply.
- ▶ Carry out initial operation procedure for both heaters.

# 10 Initial operation

## 10.1 Information on initial operation



### WARNING

#### Breathing exhaust fumes in closed rooms

Poisoning and suffocation

- ▶ Never operate the heater (also not with programmed heating start) in closed rooms such as garages or workshops that do not have an exhaust extraction unit.

- ▶ Carefully read through the heater operating instructions and the safety information within.

## 10.2 Checking operation with Webasto Thermo Test PC Diagnosis

Correct operation of the heater can be checked with the Webasto Thermo Test PC Diagnosis.

- ▶ Check heater in stable operation for approx. 15 minutes with the diagnosis monitoring function.

## 10.3 Starting up

- ✓ Heater is fully installed.
- ▶ Make sure the control unit cover is fitted in position.
- ▶ Install contact guard if necessary.
- ▶ Bleed fuel supply system using Webasto Thermo Test PC Diagnosis.
- ▶ Switch on the heater via the control element (see control element operating instructions).

## 10.4 Starting up system with two units

- ✓ Master heater and slave heater are fully installed and connected.
- ▶ Switch on the master heater via the control element (see control element operating instructions).  
To confirm correct connection of two heaters to form a system, both heaters switch once to ventilation mode.

## 10.5 Product registration

- ▶ Register the product on the internet under: <http://dealers.webasto.com>
- ▶ Hand over the registration document to the next owner or user of the unit.

# 11 Troubleshooting

## 11.1 Error code output

If an error occurs, the unit outputs a fault code via the control element.



You will find further information in the operating instructions and in the heater workshop manual.

# 12 Technical data

## 12.1 Heater

Heater	Air Top Evo 40 B	Air Top Evo 40 D	Air Top Evo 55 B	Air Top Evo 55 D
Type approval: EMC	E1 03 5529			
Type approval: Heating	E1 00 0385		E1 00 0386	
Design	Air heater with vaporising burner			
Heat flow over control range [kW]	1.7 to 3.5 (4.0)	1.5 to 3.5 (4.0)	1.7 to 5.0 (5.5)	1.5 to 5.0 (5.5)
Fuel	Petrol DIN EN 228	Diesel / biodiesel DIN EN 590/ DIN EN 14214	Petrol DIN EN 228	Diesel / biodiesel DIN EN 590/ DIN EN 14214
Fuel consumption over control range	0.18 to 0.38 (0.43) kg/h 0.25 to 0.51 (0.58) l/h	0.15 to 0.36 (0.41) kg/h 0.18 to 0.43 (0.49) l/h	0.18 to 0.54 (0.59) kg/h 0.25 to 0.73 (0.80) l/h	0.15 to 0.51 (0.56) kg/h 0.18 to 0.61 (0.67) l/h
Rated voltage [V]	12	12 / 24	12	12 / 24
Operating voltage range [V]	10.5 to 16	10.5 to 16 / 20.5 to 31	10.5 to 16	10.5 to 16 / 20.5 to 31
Rated power consumption over control range [W]	15 to 40 (55)		15 to 95 (130)	
Permissible ambient temperature (operation/storage): Heater [°C]	-40 to +40 / -40 to +85			
Permissible ambient temperature (operation/storage): Fuel pump [°C]	-40 to +20 / -40 to +85			
Permissible combustion air intake temperature [°C]	-40 to +20			
Setpoint temperature range [°C]	+5 to +35			
Volumetric flow rate with pressure loss in cold/hot air system 0.5 hPa [m <sup>3</sup> /h]	max. 132 (140)		max. 200 (220)	
CO <sub>2</sub> in exhaust gas: Rated heating capacity VL [kW]	3.5		5.0	
CO <sub>2</sub> in exhaust gas: CO <sub>2</sub> rated value VL [vol%]	8.9	9.2	10.0	
Heater length [mm]	423 ± 2			
Heater width [mm]	148 ± 1			
Heater height [mm]	162 ± 1			
Heater weight [kg]	5.9			
IP class: Heater	IP5K4K			
IP class: Fuel pump	IPX6 / IPX7 / IP6K9K			
Max. length of combustion air line and exhaust line with exhaust silencer [m]	2			
Max. length of combustion air line and exhaust line without exhaust silencer [m]	5			
Max. permissible pressure loss in cold and hot air system [hPa]	2.0		3.0	



The technical data apply under following conditions:

- Ambient temperature: +20 °C
- Geodetic height: 0 m above sea level
- Rated voltage

The standard tolerances of ±10 % for heaters shall apply if no limits are specified.



The values in brackets apply for the extended heating capacity (boost function) that is activated temporarily during each start.

# 13 Annex

## 13.1 Drilling template: heater

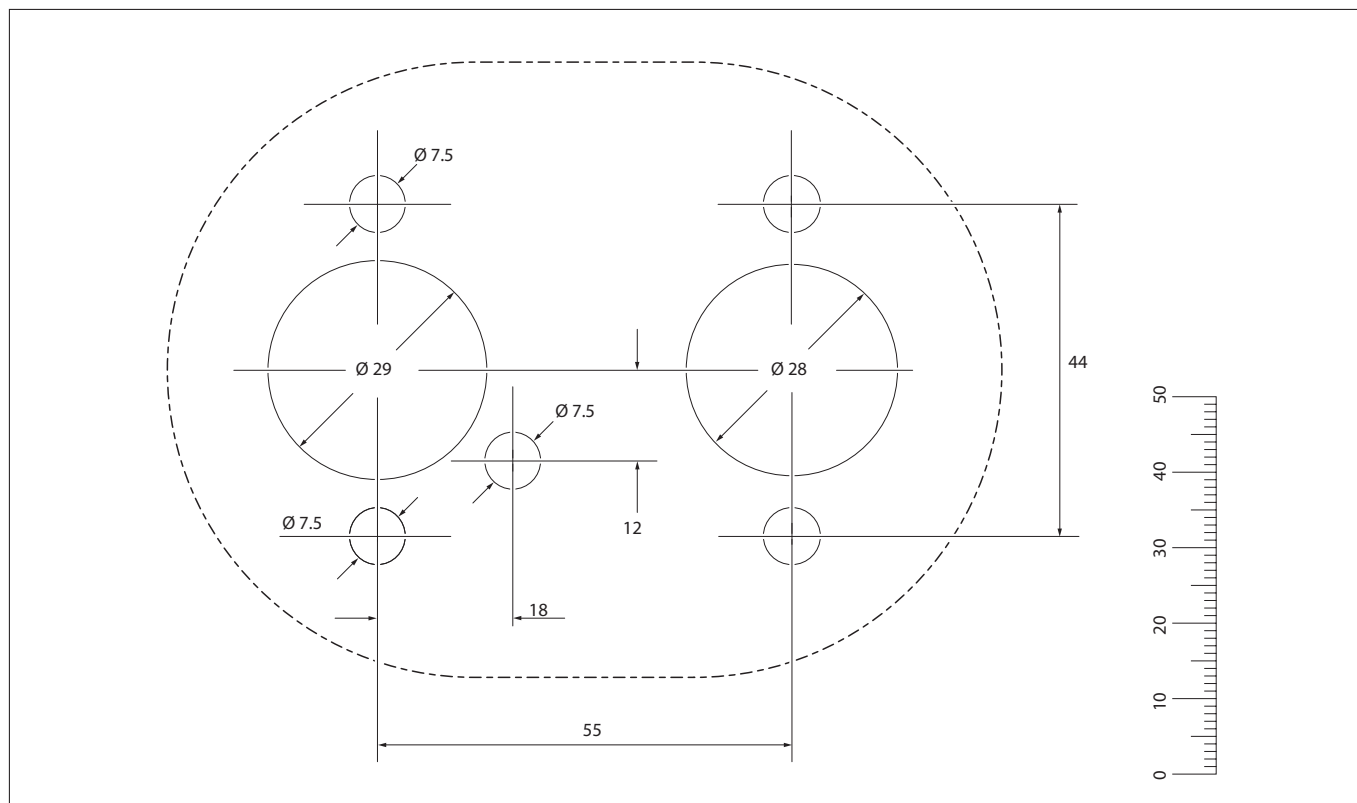


Fig. 25: Drilling template: heater



## 13.2 Legends to the wiring diagrams

### Legend to wiring diagrams

Item	Description	Remarks
A1	Heater	Air Top Evo 40 / 55
A2	Control unit	Control unit 1580
A3	UniBox	–
B2	Room temperature sensor	Inside
B3	Blow out temperature sensor	Overheating protection
B4	Room temperature sensor	Outside
B5	Exhaust gas temperature sensor	Overheating protection / flame monitor
E	Glow plug	–
F1	Fuse 24 V, 15 A / 12 V, 20 A	Blade type fuse SAE J 1284
F2	Fuse 4 A	Not included in wiring harness
F3	Fuse 1 A	Blade type fuse SAE J 1284
F4	Fuse 4 A	Not included in wiring harness
F5	Fuse	Value [in A] to be selected corresponding to wire cross section
H1	LED green (in Item S1)	Operating indicator
H2	LED red (in Item P)	Lighting:Quick Heating button, Ready indicator, ON indicator
H3	Heating symbol on display (in Item P)	Operating indicator
H4	Bulb/LED (in Item P and S)	Display and button lighting
H5	Bulb/LED	ON indicator, pumping device (max. 500 mA)
H6	LED (green, blue, white, red)	Operation indicator, Ready indicator, ON indicator, operation indicator
H7	Symbol on display	–
K	Relay with free-wheeling diode	Vehicle blower (max. 500 mA)
M1	Motor	Combustion air and heating air blower
M3	Motor	Vehicle blower
P	Combi timer	Timer and temperature selector
P1	SmartControl	–
P2	SmartControl / Multi Control	–
S	Air Top Evo Multi Control (MC04)	ON/OFF button, selector switch for additional functions and temperature selector
S1	Rotary selector control element	ON switch and temperature selector
S2	Switch	Ventilation
S3	Switch	CO2 setting
S4	Pushbutton	External Quick Heating button
S5	Switch	auxiliary drive / pumping device
S6	Switch, 1 or 2-pin	Disconnecter
S7	Battery disconnecter	Electronically controlled disconnecter (max. 500 mA)
V1 / V2	Blocking diode	Min. 500 mA
X1 – X6	Plug connection	To Item A2
X7	Plug connection	To control unit
X8	Plug connection	To Item A2
X9	Plug connection	–
X9 (a)	Plug connection	To Item S or S1
X9 (b)	Plug connection	To Item S or S2
X9 (c)	Plug connection	W-bus, optional Telearstart (12 V) or Thermo Call connection
X1 – X11	Plug connections	In heater on control unit
X13	Plug connection	To Item Y1
X14	Plug connection	–
X15	Plug connection	To Item S3
X16	Plug connection	Wiring harness connection DP42
X17	Plug connection	Wiring harness connection DP42
Y1	Fuel pump	DP42
Y2	Solenoid valve / pump	auxiliary drive / pumping device (max. 500 mA)

### Legend to remarks in wiring diagrams

Item	Remarks
1	Positive from terminal 15/75 to connection 10: Continuous heating mode is possible in connection with quick heating function provided the ignition is switched on.
2	All heater versions: W-bus diagnosis connection Heater versions with control elements Multi Control (MC04) and Combi timer: Thermo Call 12 V/24 V connection and Telearstart (only 12 V) connection. Installation as system: Connection to slave heater (yellow/blue wire). Slave wiring harness is included in the Slave scope of delivery.
3	CO2 setting (see workshop manual)
4	Connection to terminal 30: Continuous heating mode is possible with ignition switched off.
5	Grey and violet wires required for ADR function. Non-ADR vehicles: Insulate and tie back ends of wires.
6	External temperature sensor (optional) Installation as system: External temperature sensor must be connected to master heater.
7	Fuse in vehicle.
8	Pin 7 "Boost" Only ambulance heater version (door contact connected to terminal 31).
9	The connection is required for use of the Combi timer 1531 in ADR vehicles.
10	Wiring harness adapter (optional)
11	Switching capacity 250 mA

### Cable cross-sections

Graphic	<7.5 m	7.5 – 15 m
	0.75 mm <sup>2</sup>	1.0 mm <sup>2</sup>
	1.0 mm <sup>2</sup>	1.5 mm <sup>2</sup>
	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>
	2.5 mm <sup>2</sup>	4.0 mm <sup>2</sup>
	4.0 mm <sup>2</sup>	6.0 mm <sup>2</sup>



Wires or components shown with dashed lines are optional and not included in the scope of delivery or in the wiring harness.

### Cable colours

Abbreviation	Colour
bu	blue
bn	brown
ye	yellow
gn	green
gy	grey
og	orange
rd	red
bk	black
vt	violet
wh	white

## Connector X7 pin assignments

Item	Remarks
1	Battery disconnecter / operation indicator
2	Power supply, control element / error code output
3	Battery disconnecter / operation indicator
4	Voltage supply + (terminal 30)
5	Voltage supply - (terminal 31)
6	Switch-on signal (ON/OFF)
7	Multifunction (ventilation, boost, ECO) with control element MC02, only Boost activation for ambulance units
8	Setpoint sensor -
9	CO2 setting
10	Not used
11	Setpoint sensor +
12	W-bus (Webasto Thermo Test PC-Diagnosis connection)

## 13.3 Wiring diagrams

### Air Top Evo 40 and Air Top Evo 55, 12 V/24 V with rotary selector control element and vehicle blower

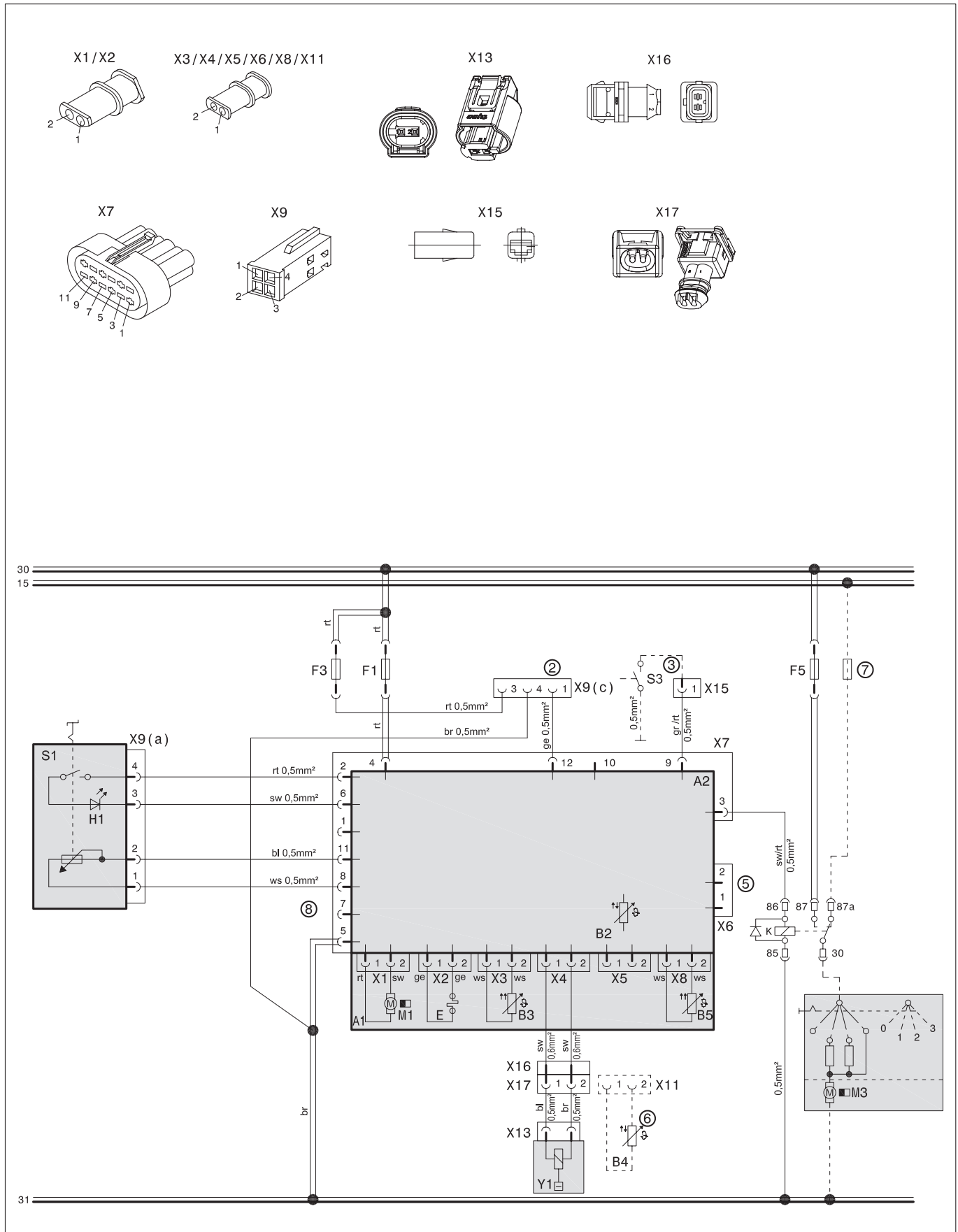


Fig. 26: Wiring diagram - Air Top Evo 40 and Air Top Evo 55, 12 V/24 V with rotary selector control element and vehicle blower

# Air Top Evo 40 and Air Top Evo 55, 24 V ADR operation with rotary selector control element

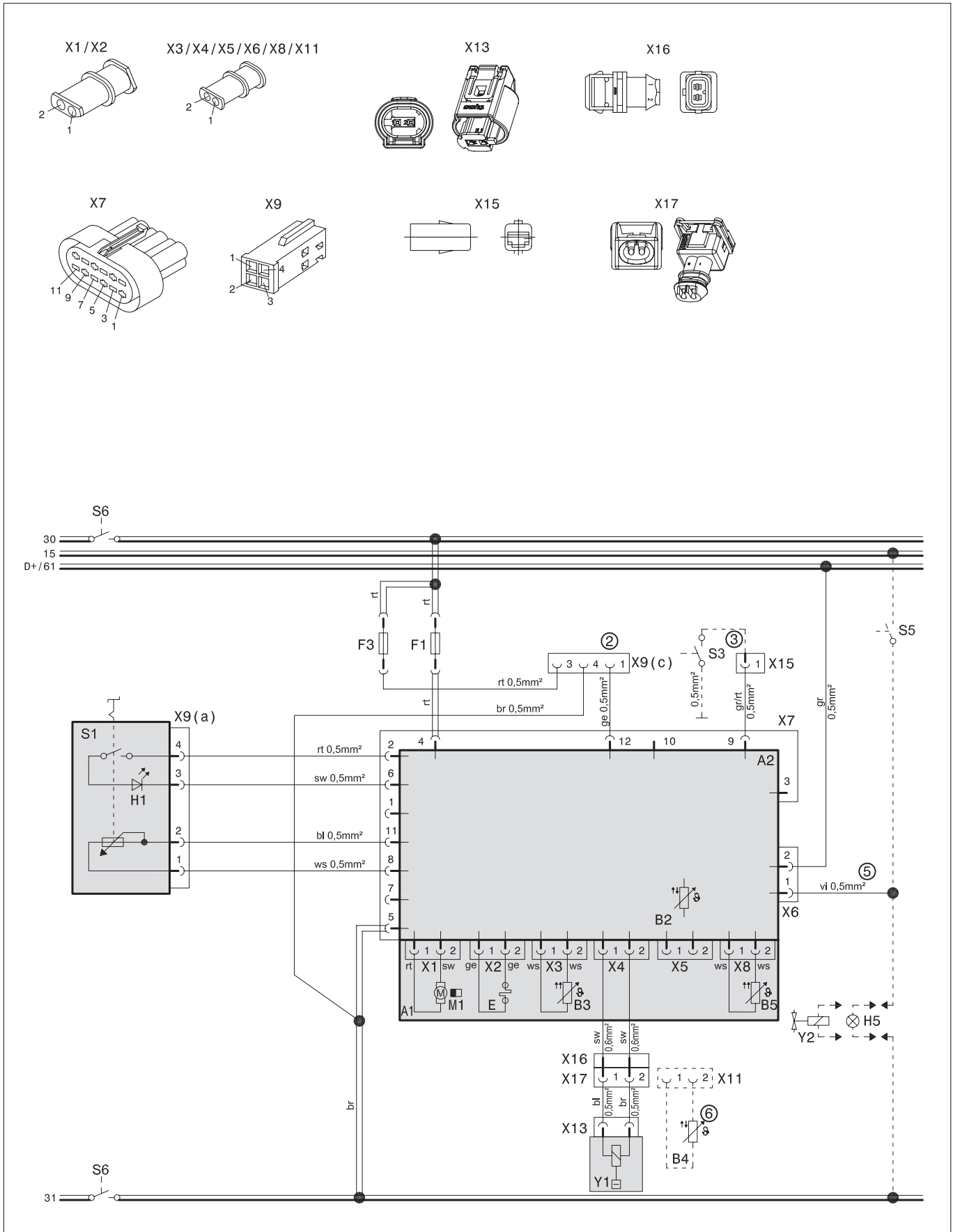


Fig. 27: Wiring diagram - Air Top Evo 40 and Air Top Evo 55, 24 V ADR operation with rotary selector control element

Air Top Evo 40 and Air Top Evo 55, 12 V/24 V with Combi timer control element and electrical battery disconnecter

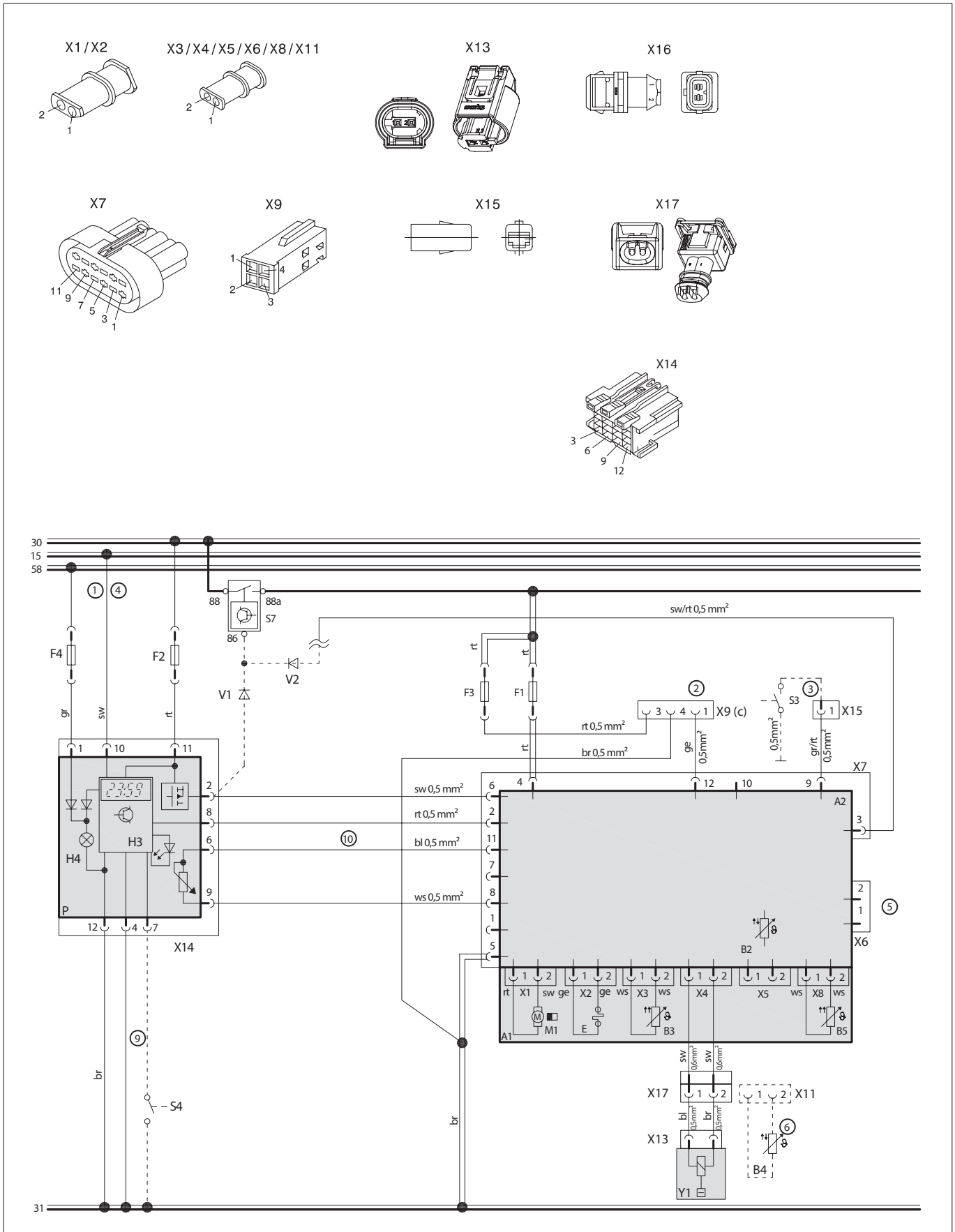


Fig. 28: Wiring diagram - Air Top Evo 40 and Air Top Evo 55, 12 V/24 V with Combi timer control element and electrical battery disconnecter

Air Top Evo 40 and Air Top Evo 55, 24 V with SmartControl / MultiControl control element

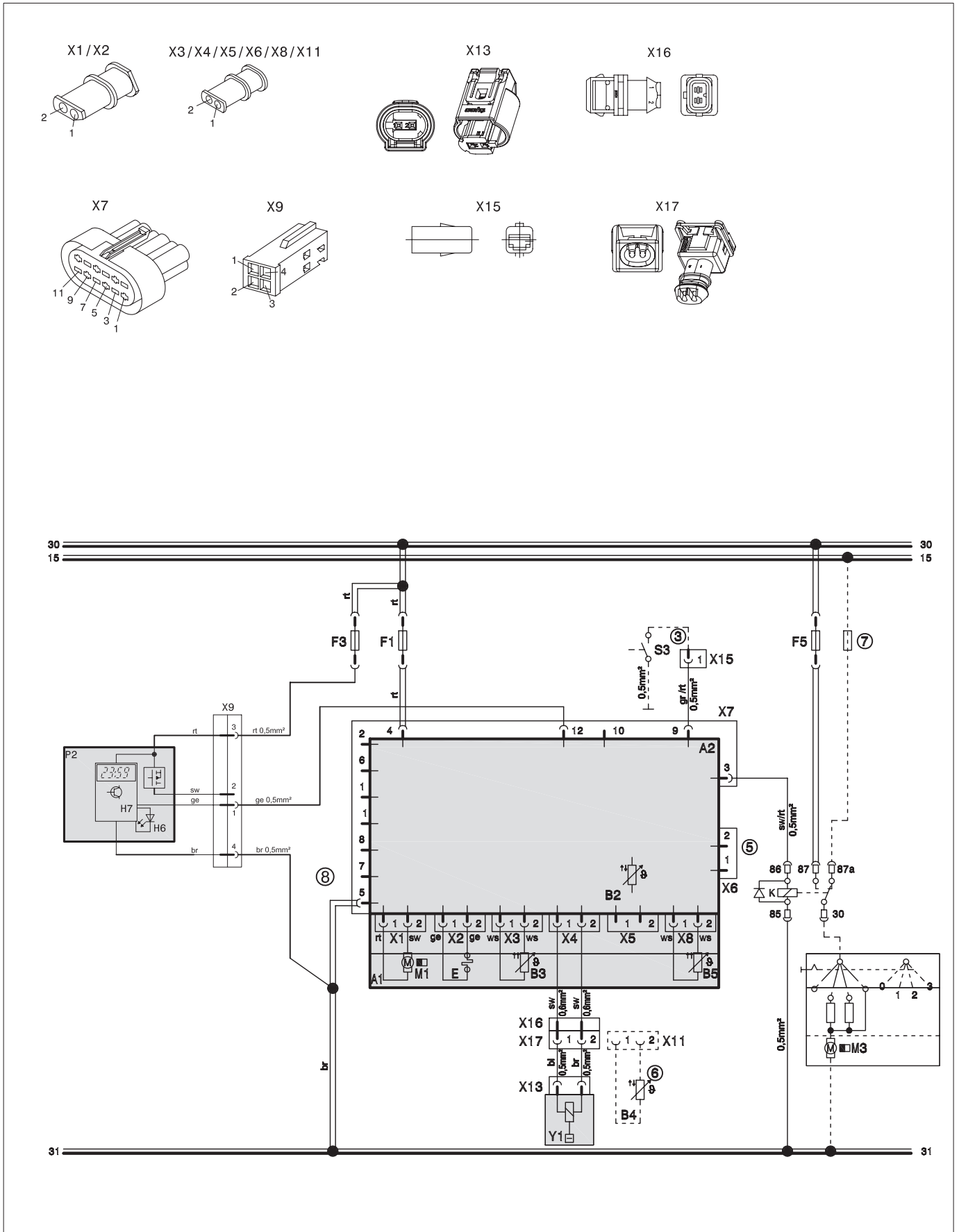


Fig. 29: Wiring diagram - Air Top Evo 40 and Air Top Evo 55, 24 V with SmartControl / MultiControl control element

Air Top Evo 40 and Air Top Evo 55, 12 V/24 V with Multi Control (MC04) control element and vehicle blower

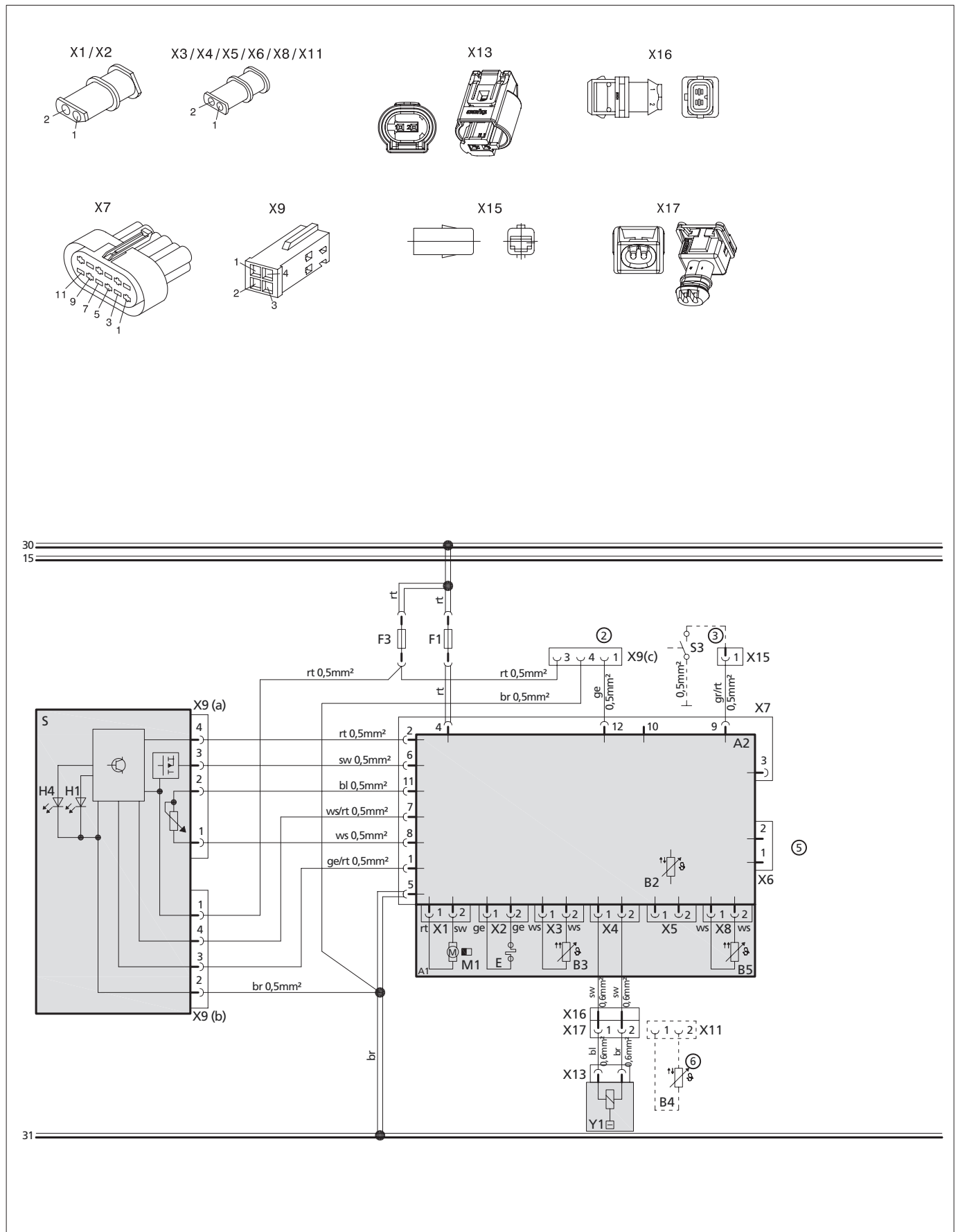


Fig. 30: Wiring diagram - Air Top Evo 40 and Air Top Evo 55, 12 V/24 V with Multi Control (MC04) control element and vehicle blower (wiring harness: optional)

Air Top Evo 40 and Air Top Evo 55, 24 V with SmartControl / MultiControl Unibox control element

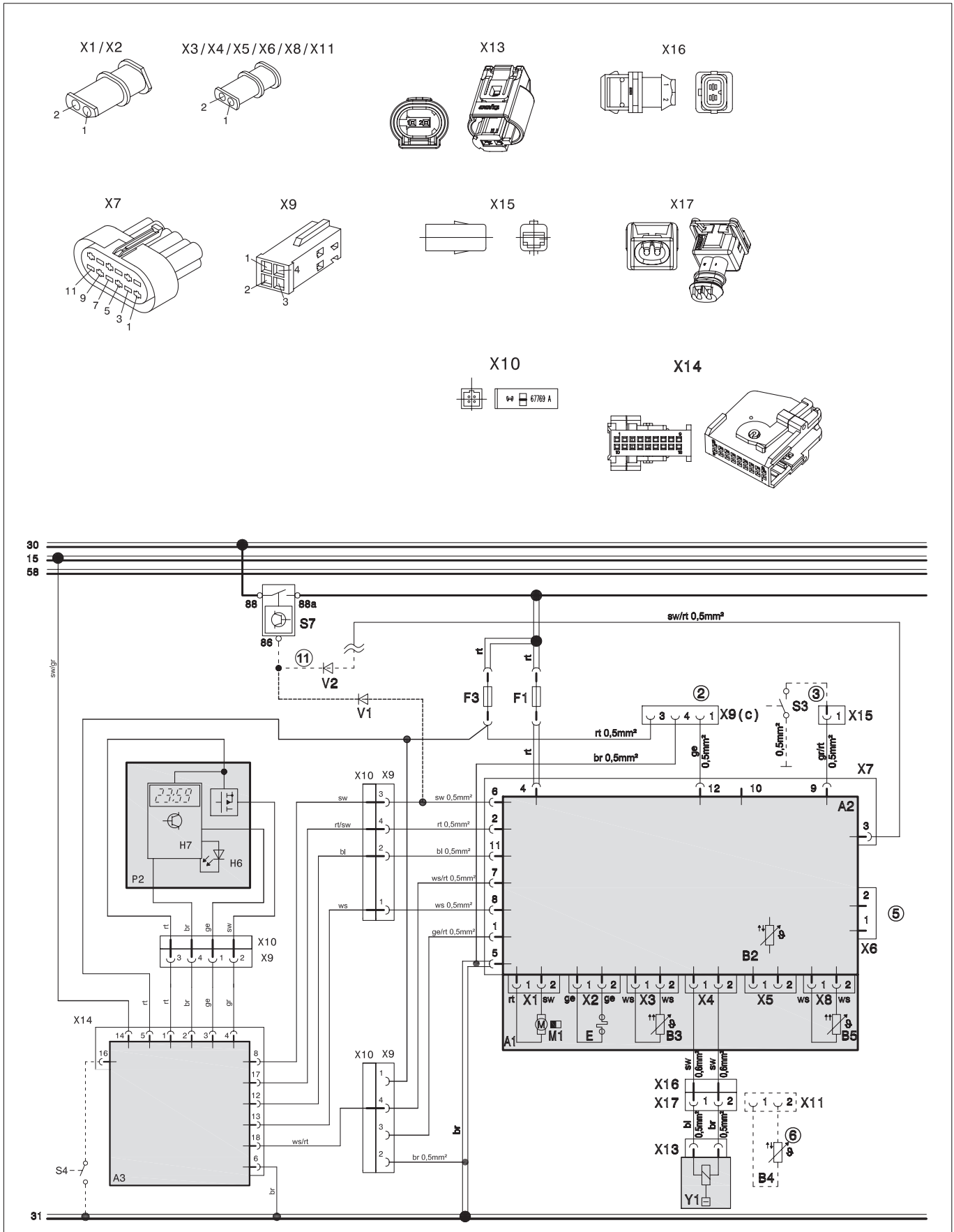


Fig. 31: Wiring diagram - Air Top Evo 40 and Air Top Evo 55, 24 V with SmartControl / MultiControl Unibox control element





Air Top Evo 40 and Air Top Evo 55, 12 V/24 V, "Master heater"

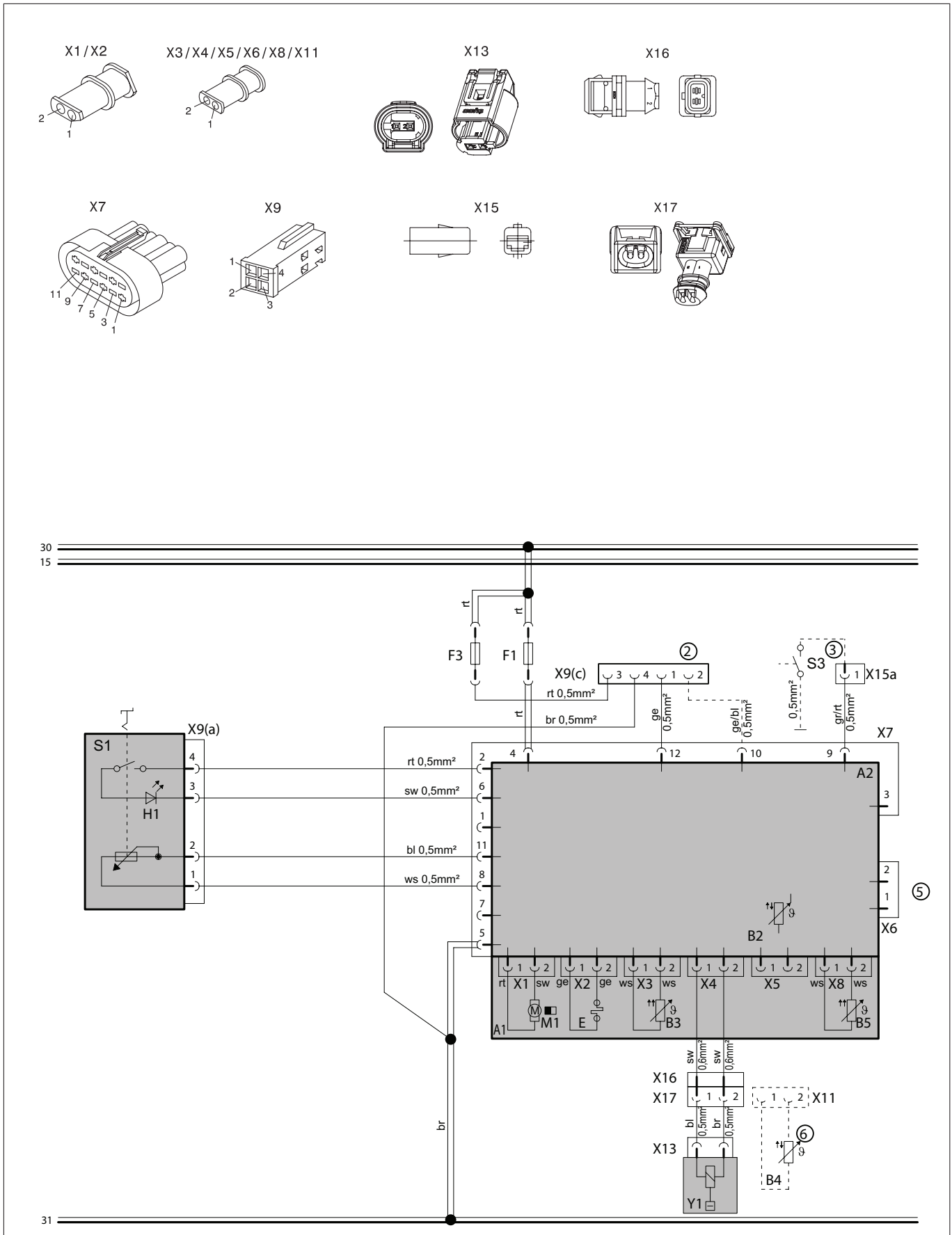


Fig. 33: Wiring diagram - Air Top Evo 40 and Air Top Evo 55, 12 V/24 V, "Master heater"

Air Top Evo 40 and Air Top Evo 55, 12 V/24 V, "Slave heater"

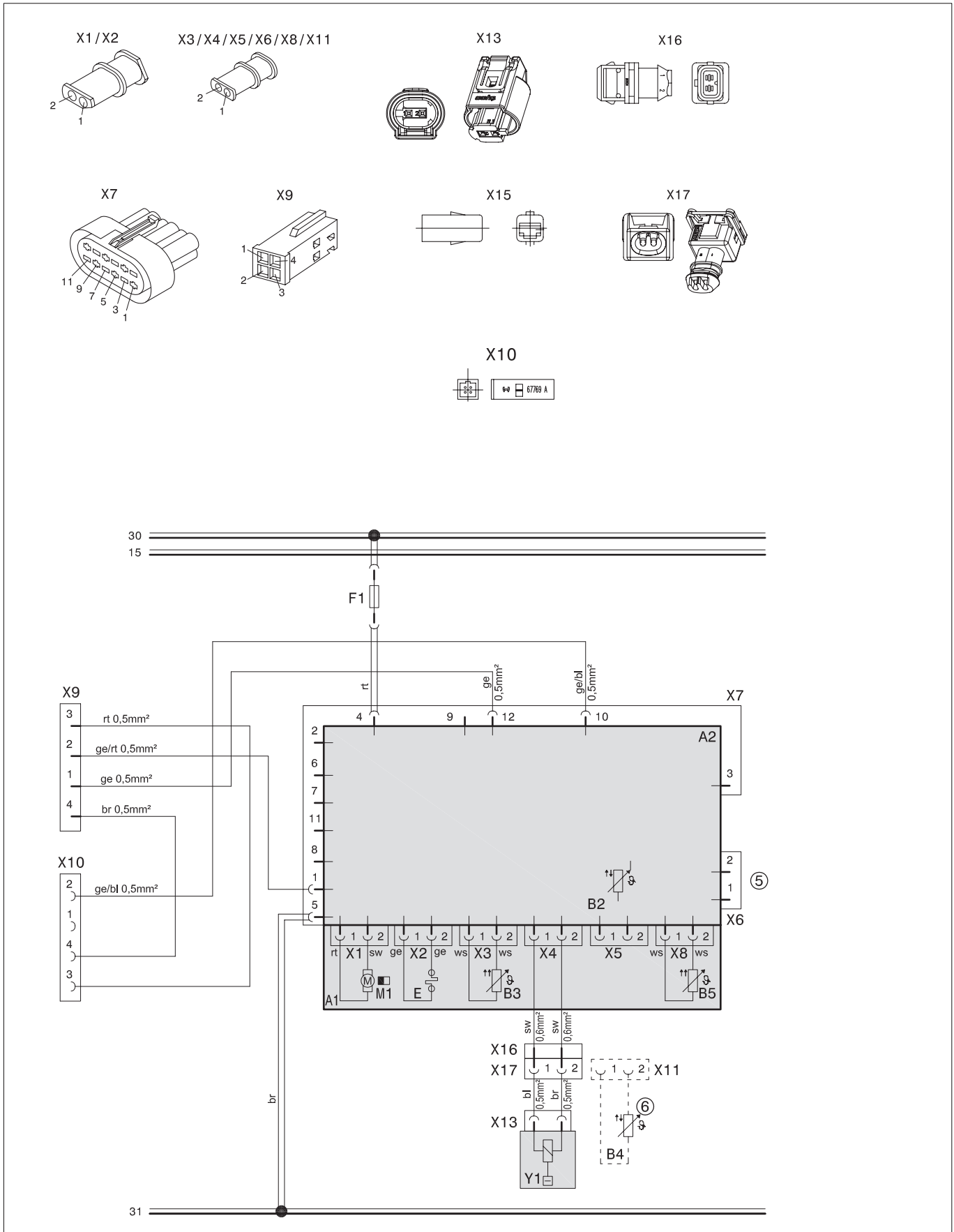


Fig. 34: Wiring diagram - Air Top Evo 40 and Air Top Evo 55, 12 V/24 V, "Slave heater"

In multilingual versions the German language is binding.

The telephone number of the respective country can be obtained from the Webasto service point flyer or the homepage of your respective Webasto country representative.

Webasto Thermo & Comfort SE  
Postfach 1410  
82199 Gilching  
Germany

Visiting address:

Friedrichshafener Str. 9  
82205 Gilching  
Germany

Technical Extranet: <http://dealers.webasto.com>



[www.webasto.com](http://www.webasto.com)

