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Wasserheizgerät
Water heater
Appareil de chauffage à eau

Einbauanweisung
Installation Instructions
Notice de montage

Thermo Pro 50 Eco

Thermo Pro 50 Eco 24 V Diesel - ADR
(Gefahrguttransport)
(Transport of dangerous goods)
(Transport des marchandises dangereuses)

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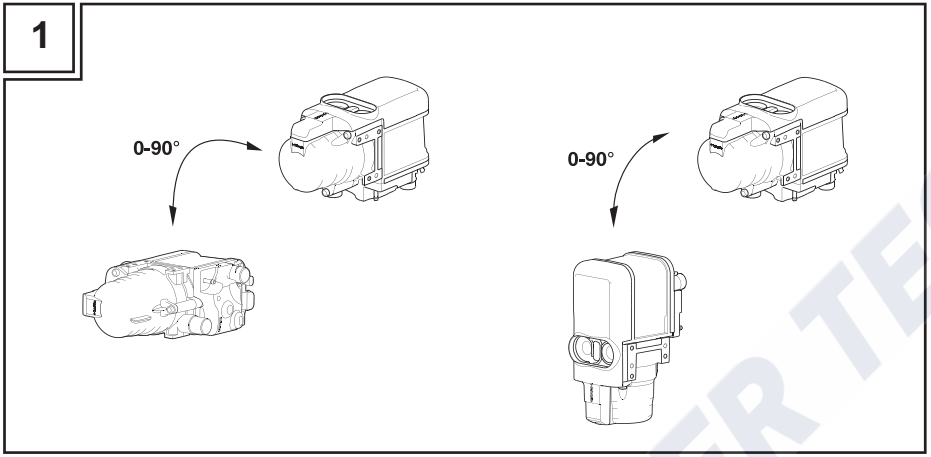

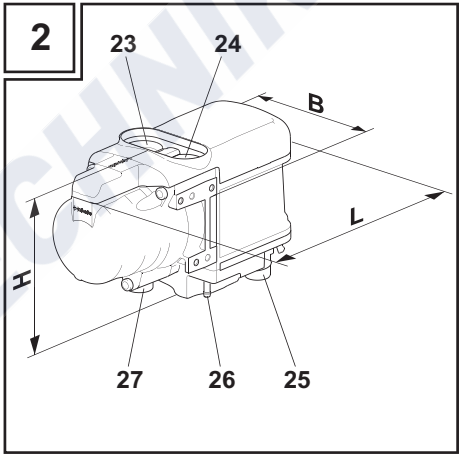

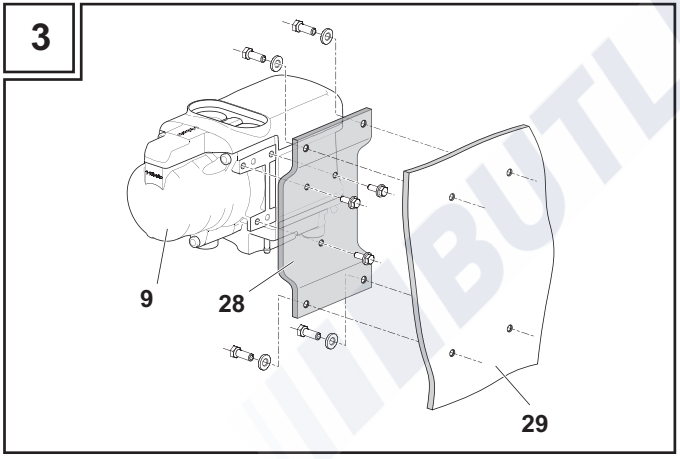

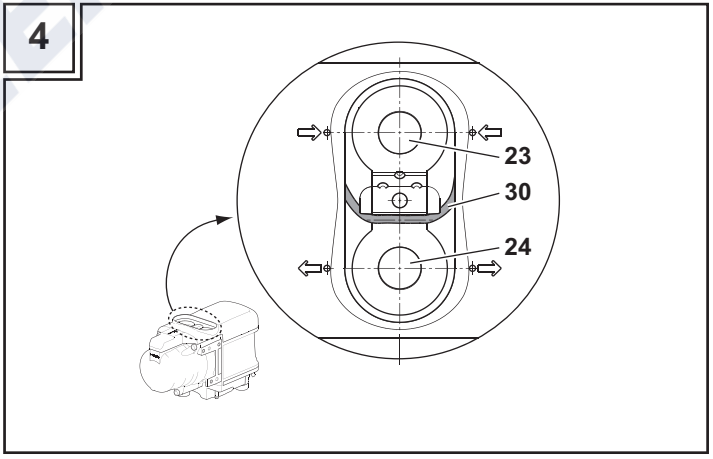

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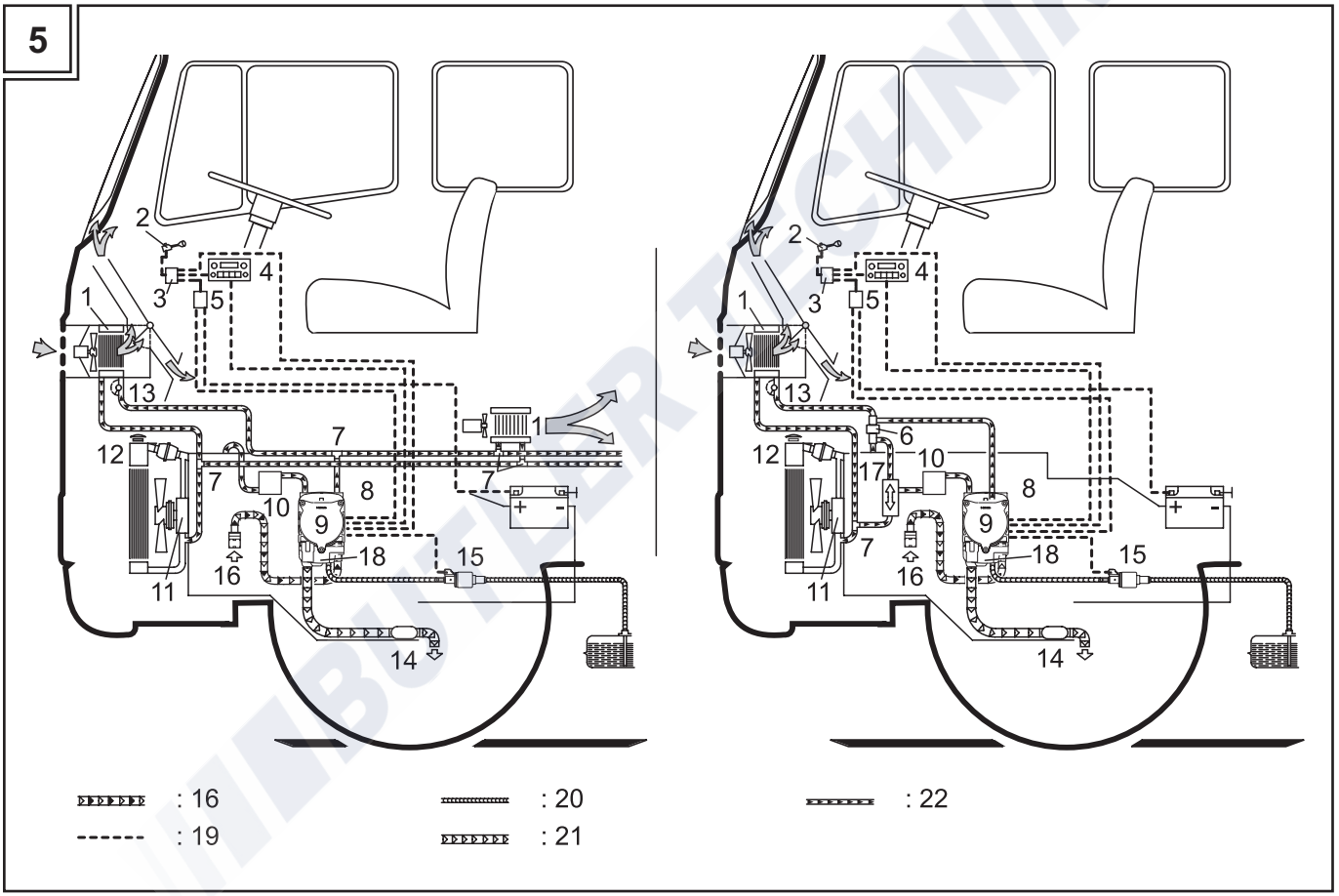
Thermo Pro 50 Eco



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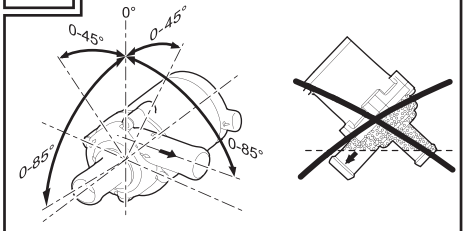

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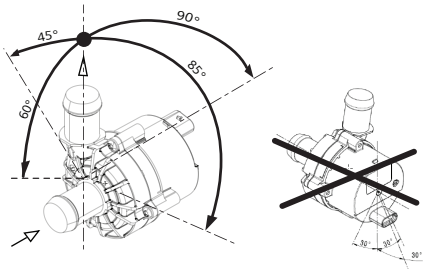

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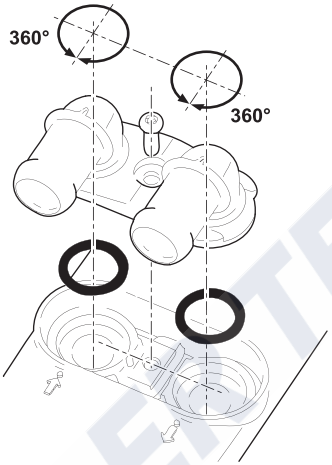

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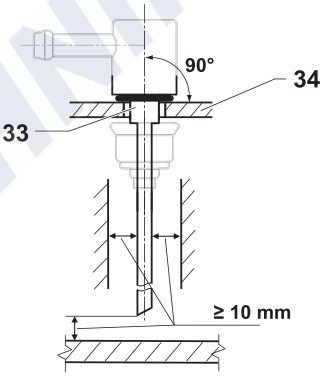

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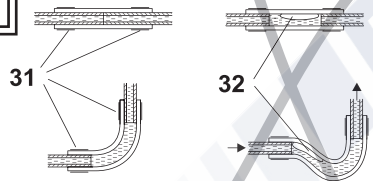

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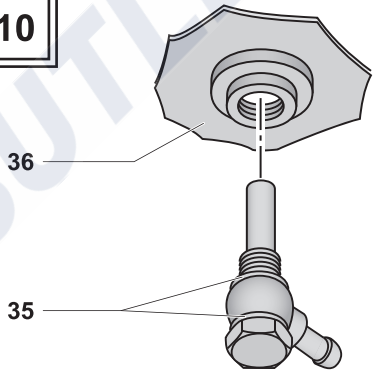

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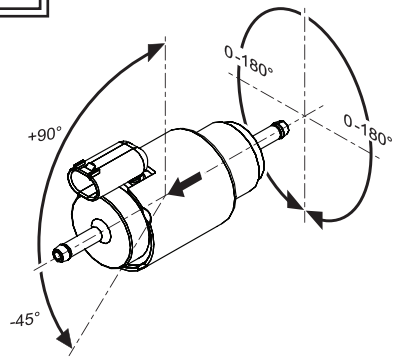

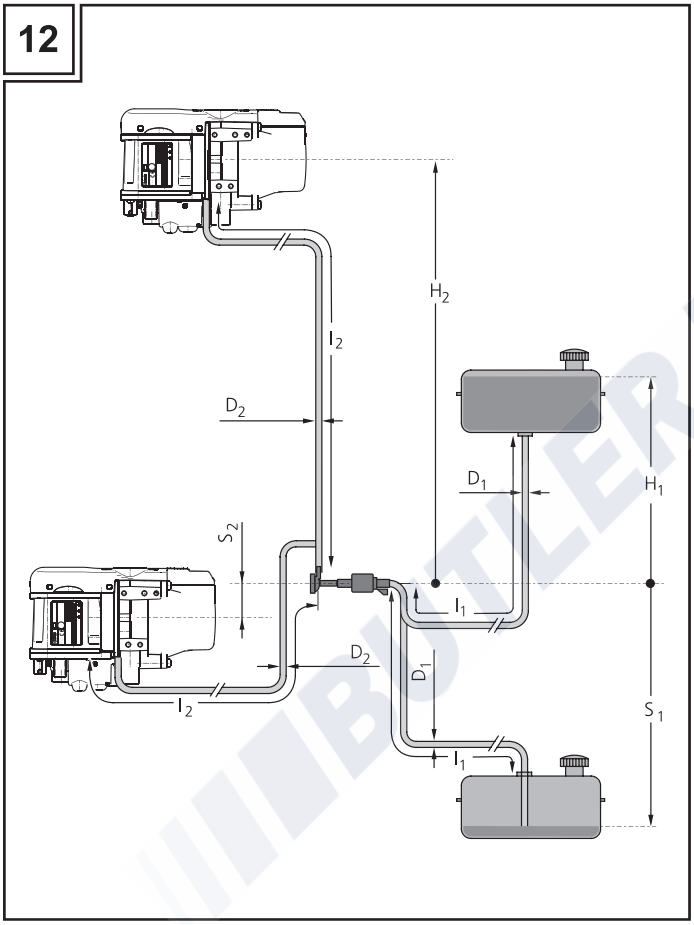

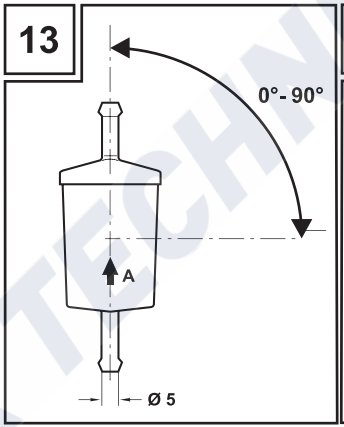

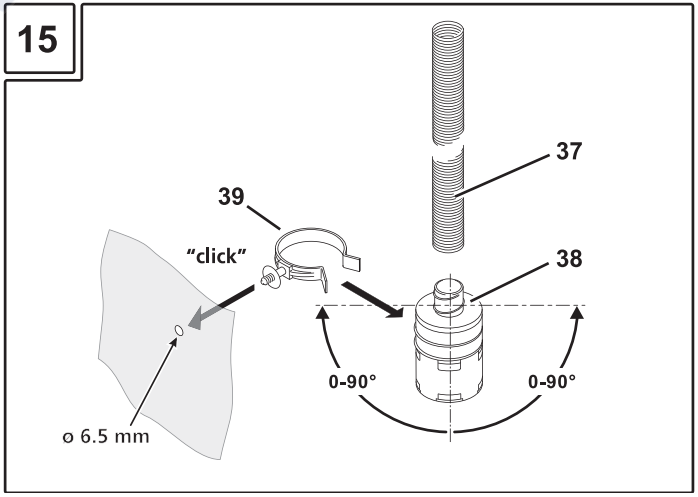

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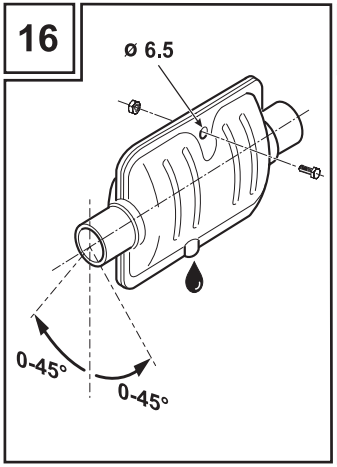
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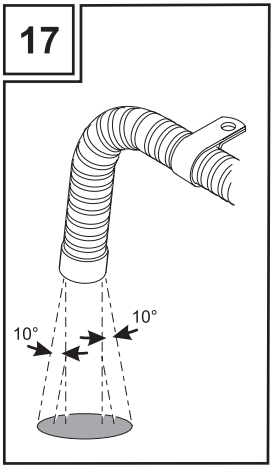
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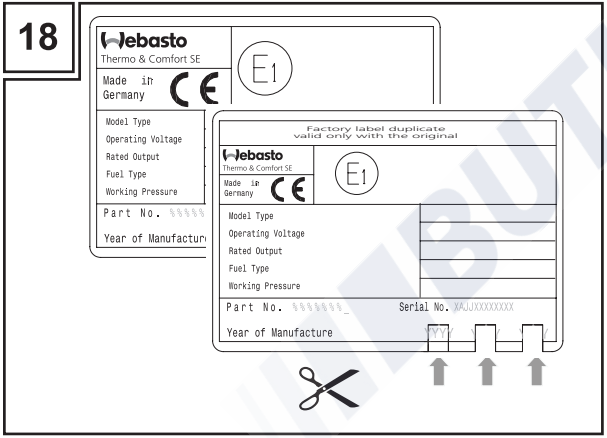
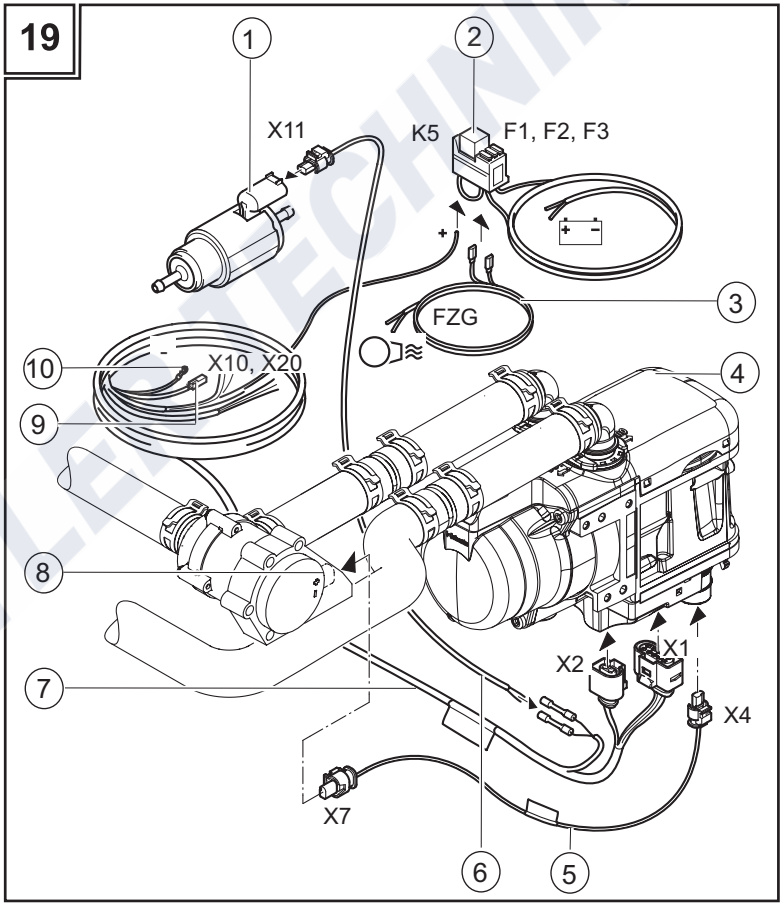

18
Webasto
Thermo & Comfort SE
Made in Germany
E1
Model Type
Operating Voltage
Rated Output
Fuel Type
Working Pressure
Part No.
Year of Manufacture
Factory label duplicate
valid only with the original
Serial No.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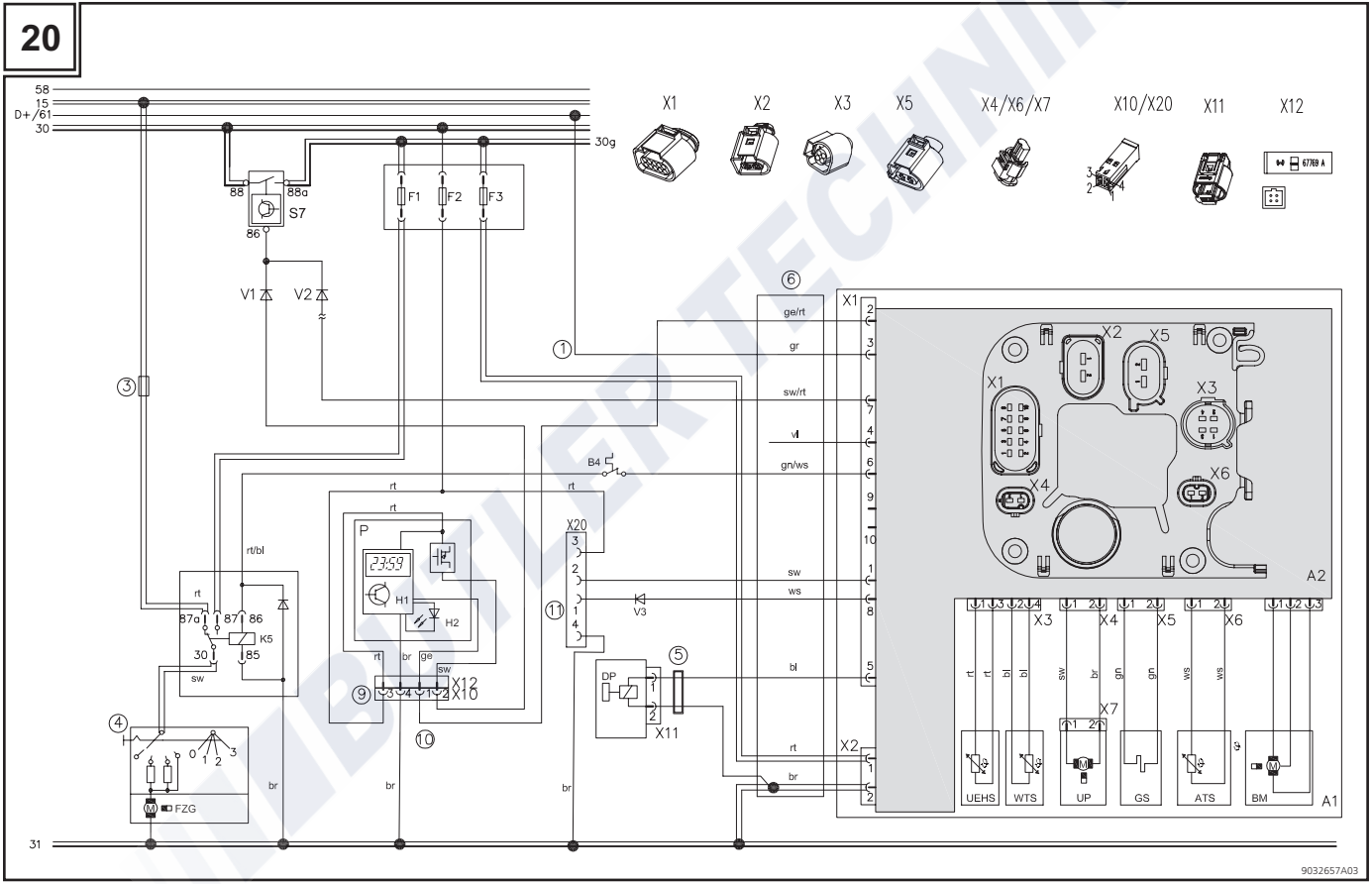
Thermo Pro 50 Eco



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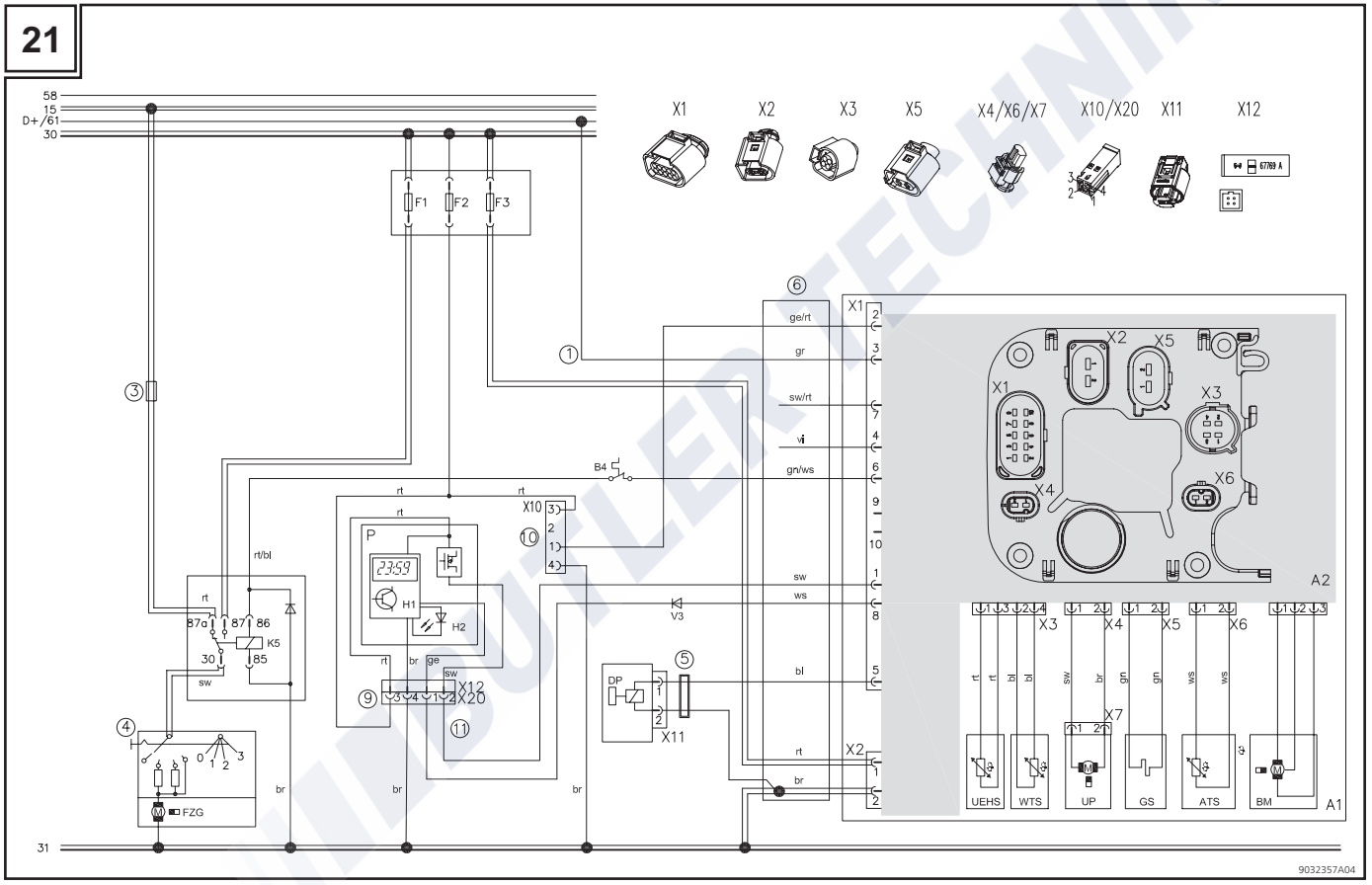
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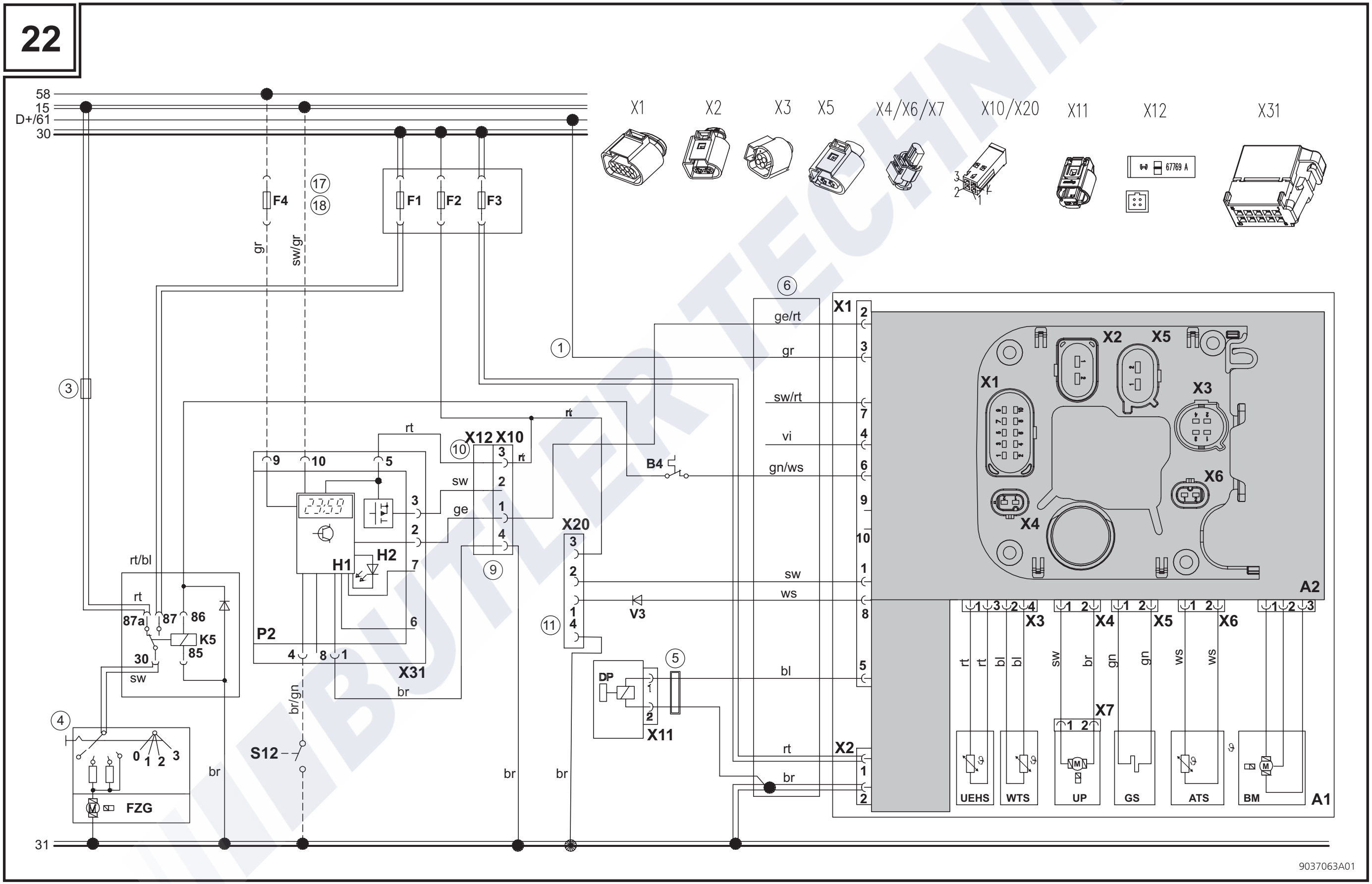
Thermo Pro 50 Eco



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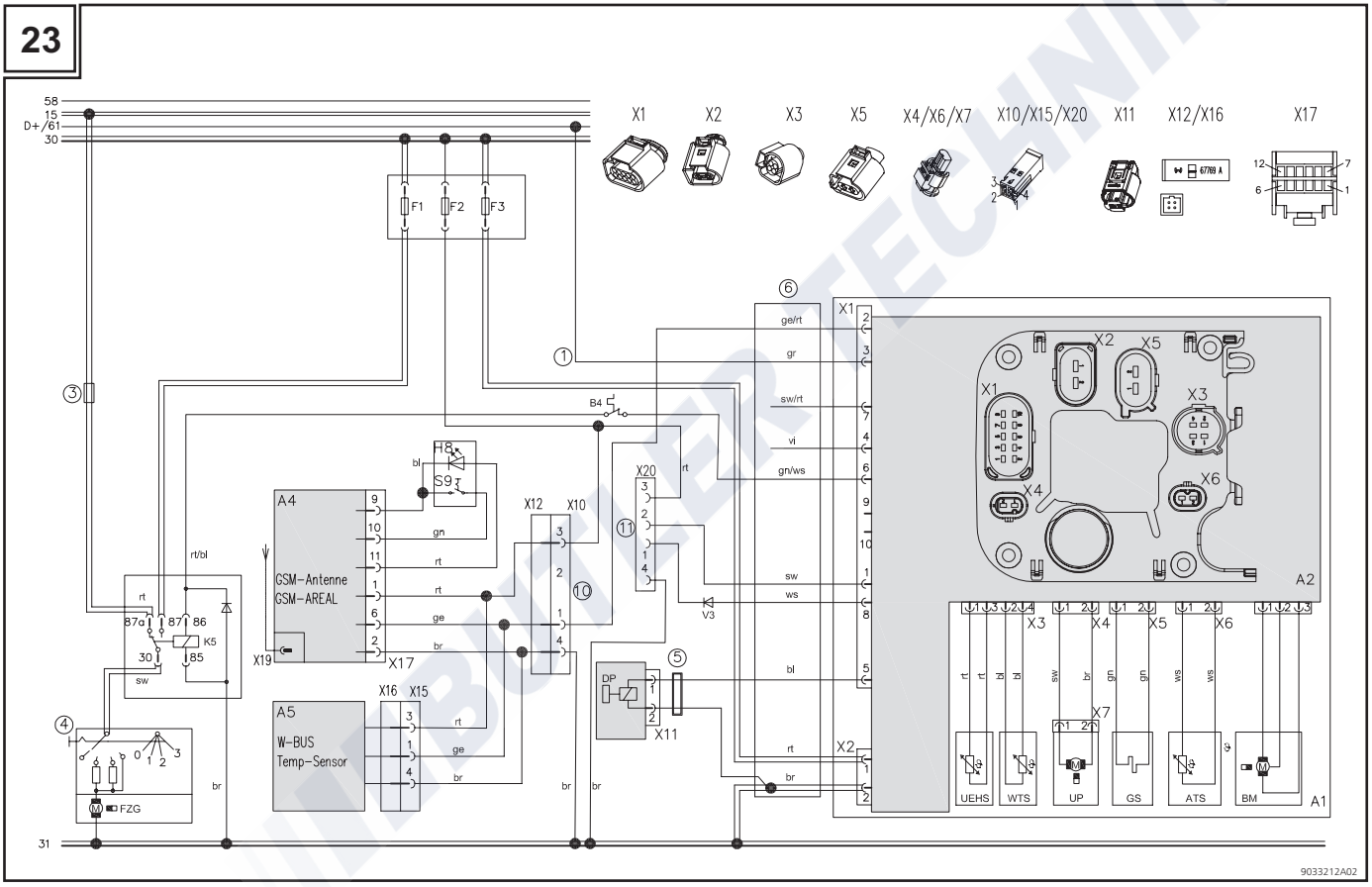
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A4
GSM-Antenne
GSM-AREAL
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X12
X10
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V3
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W-BUS
Temp-Sensor
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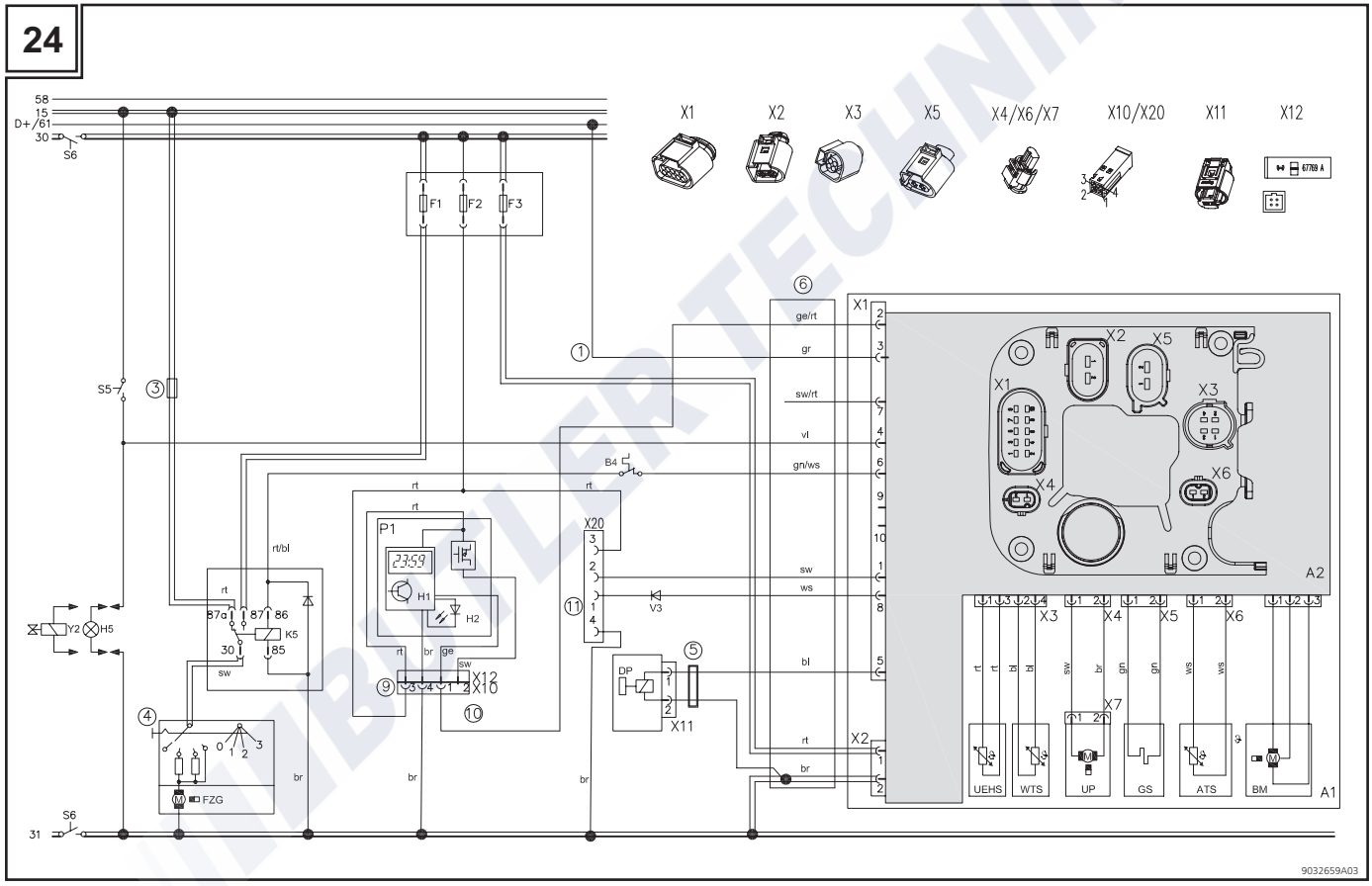
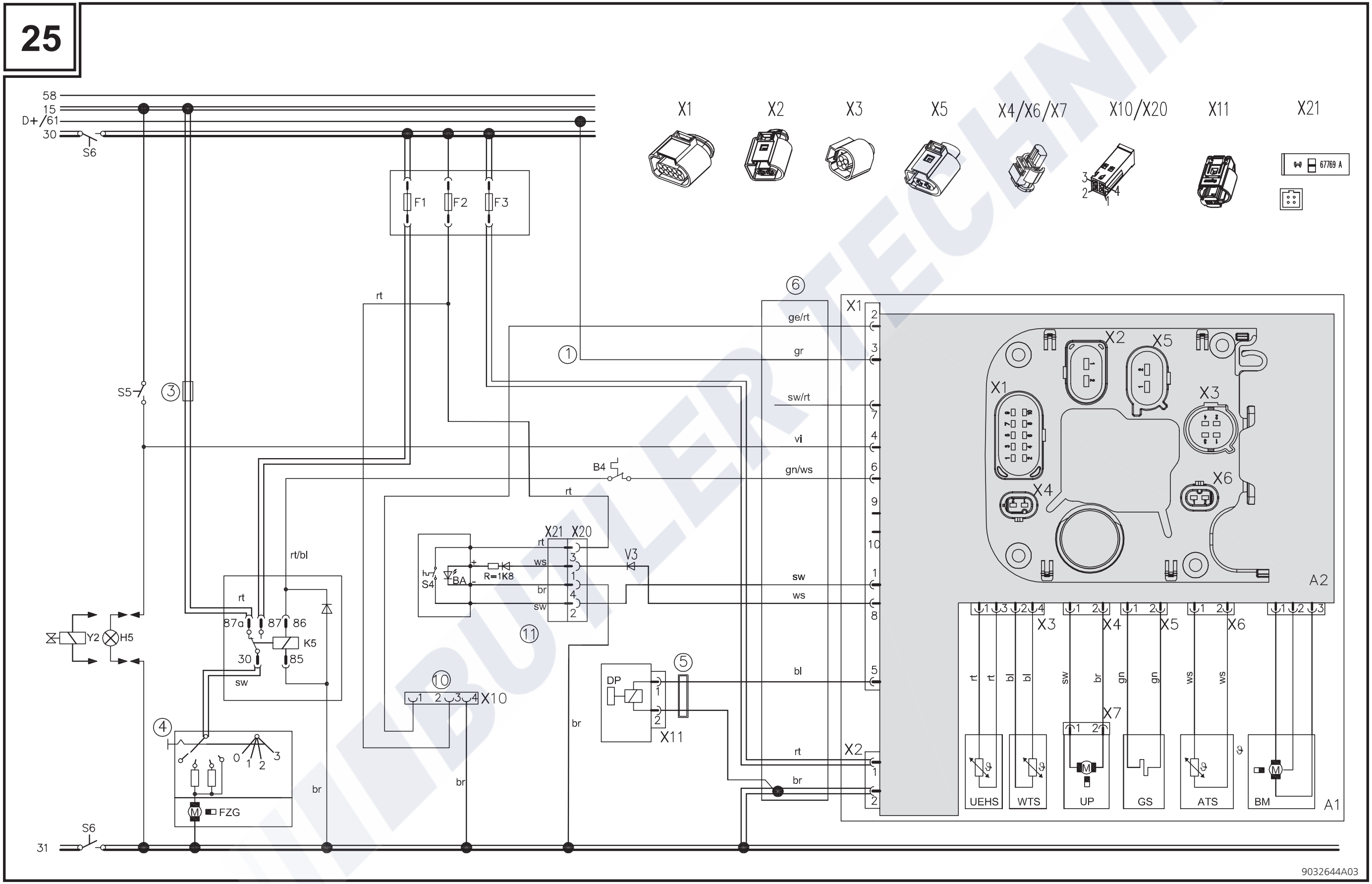
Thermo Pro 50 Eco

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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 Webasto training course and have the appropriate technical documentation, special tools and special equipment.

Only genuine Webasto parts may be used. See also Webasto air and water heaters accessories catalogue.

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.

ALWAYS carefully follow Webasto installation and repair instructions and heed all WARNINGS.

Webasto rejects any liability for problems and damage caused by the system being installed by untrained personnel.

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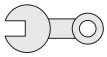
To enable quick reference to the individual procedures you will find a descriptive symbol on the top outer edge of each page.
Sections presented in italics contain excerpts from the Regulation ECE-R 122.

Mechanical system 

Electrical system 

Coolant circuit 

Fuel 

Exhaust gas 

Combustion air 

Technical Information 

Attention 

Note 

BUTLER TECHNIK

1 Regulations governing installation

1.1 Statutory regulations governing installation

The Thermo Pro 50 Eco heater has been type-tested and approved in accordance with ECE-R 10 (EMC) and ECE-R 122 (heater).
For approval number see Section 14 Technical data (page 49).

The stipulations of these regulations are binding in the area covered by EU Directive 70/156/EEC and/or 2007/46/EC (for new vehicle models from 29/04/2009) and should also be observed in countries where there are no specific regulations.

Failure to follow the installation instructions and the notes contained therein will lead to all liability being refused by Webasto. The same applies if repairs are carried out incorrectly or with the use of parts other than genuine spare parts. This will result in the invalidation of the type approval for the heater and therefore of its homologation / EC type licence.

1.2 Application of combustion heaters in vehicles for the transportation of dangerous goods.

Vehicles used for the purpose of transporting dangerous goods are type approval tested in accordance with ECE-R 105. The following measures are derived for our combustion heaters.

- The electrical cable/wiring harness must be sufficiently dimensioned to prevent overheating. The electrical cable/wiring harness must be sufficiently insulated. All electrical circuits must be protected by fuses or automatic circuit breakers.
- The cables must be installed and firmly secured such that the wirings are adequately protected against mechanical and thermal stress.
- The combustion heaters must be type-tested in accordance with ECE-R 122 and comply with Annex 9 - Additional regulations for vehicles used for transporting dangerous goods.
- The combustion heaters and their exhaust gas piping system must be designed, arranged, protected or covered so as to prevent any unacceptable risk of heating or ignition of the load.
- In the event of any fuel line leakage, the fuel shall drain to the ground without coming into contact with hot parts of the vehicle or the load.
- The exhaust system as well as the exhaust pipes shall be so directed or protected to avoid any danger to the load through heating or ignition. Parts of the exhaust system situated directly below the fuel tank shall have a clearance of 100 mm or be protected by a thermal shield.
- It must only be possible to switch the combustion heater on manually. Programming devices shall be prohibited. The combustion heater may be switched back on manually after switching off the vehicle engine.

Requirements relating to the basic unit:
When switched off, it is permissible for combustion heaters to continue running for max. 40 seconds. Only combustion heaters are to be used with heat exchangers that are not damaged during their standard operating period by the reduced afterrunning time of 40 seconds.

1.3 Additional documentation to be used

These installation instructions contain all the information and instructions necessary to install a Thermo Pro 50 Eco heater.
The following must additionally be observed:

- The Operating Instructions for the heater,
- The Operating and Installation Instructions for the control element

Detailed technical information is provided in the service manual for the heater.

2 Use / variants

2.1 Use of the water heater

The water heater has been designed for installation in commercial vehicles. If it is installed in special-purpose vehicles, the applicable regulations must be taken into account. Alternative applications are possible in agreement with Webasto.

2.1.1 Parking heating

In parking heating mode, the water heater works together with the vehicle's heating system for

- cab and engine preheating,
- use of residual heat from the vehicle engine.

The water heater operates independently of the vehicle engine and is integrated into the cooling system, the fuel system and the electrical system of the vehicle.

2.1.2 Auxiliary heating

The water heater works during engine operation and provides thermal assistance to the cooling system. The water heater is integrated into the cooling system, the fuel system and the electrical system of the vehicle.

When the engine is switched off, the water heater is automatically switched off and fuel supply is interrupted within 25 seconds.

2.2 Variants

- **Thermo Pro 50 Eco 24 V diesel - ADR**

  Water heater for "diesel" fuel. The water heater is designed for 24 volts.

For technical information see Chapter 14 Technical data (page 49).

3 Installation

- The water heater may only be installed outside the passenger compartment.
- The requirements stipulated in the current version of the ADR must be additionally observed when installing the corresponding heater in vehicles used to transport dangerous goods.

Where there are specifications from the vehicle manufacturer, these must be observed.

The water heater must **not** be installed:
- In the direct radiated heat range of exhaust systems
- Below the wading line of the vehicle
- Above the coolant expansion tank.

3.1 Installation location/installation position

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.
(Requirement from ECE-R 122, point 5.3.2.1.).
The heater shall not constitute a risk of fire, even in the case of overheating. This requirement shall be deemed to be met 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.
(Requirement from ECE-R 122, point 5.3.2.2.).
It should be installed as low as possible in order to ensure automatic bleeding of the heater and coolant pump.
This is particularly relevant for the coolant pump which is not self-priming.
Permissible installation positions for the heater:
See Fig. 1
Connection positions for the heater:
See Fig. 2
Dimensions of heater:
See Fig. 2 and Chapter 14 Technical data (page 49).
Legend for Fig. 2:
23) Heat exchanger inlet
24) Heat exchanger outlet
25) Combustion air inlet
26) Fuel inlet
27) Exhaust gas outlet
L = Length
W = Width
H = Height

3.2 Installing the heater

Every reasonable precaution should be taken in positioning the heater to minimize the risk of injury and damage to personal property.
(Requirement from ECE-R 122, point 5.3.2.5.).
For ADR only:
EX/II, EX/III, AT, FL and OX vehicles:
The combustion heaters and their exhaust gas routing shall be designed, located, protected or covered so as to prevent any unacceptable risk of heating or ignition of the load. This requirement shall be considered as fulfilled if the fuel tank and the exhaust system of the appliance conform to the following provisions:
- Each fuel tank for supplying the heater must comply with the following regulations:
  a) In the event of a leak, the fuel must drain to the ground without coming into contact with hot parts of the vehicle or the load;

[...]

- The exhaust system as well as the exhaust pipes shall be so directed or protected to avoid any danger to the load through heating or ignition. Parts of the exhaust system situated directly below the fuel tank (diesel) shall have a clearance of at least 100 mm or be protected by a thermal shield.

Compliance with this paragraph shall be verified on the completed vehicle.
(Requirement from ECE-R 122, Annex 9, point 3.1.1).
FL vehicles:
The combustion heaters shall be put out of operation by at least the following

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methods:
a) Intentional manual switching off from the driver's cab;
b) Stopping of the vehicle engine; in this case the heater may be restarted manually by the driver;
c) Start up of a feed pump on the motor vehicle for the dangerous goods carried.
[...]
(Requirement from ECE-R 122, Annex 9, point 3.3.1).

3.3 Standard bracket

The heater must be fastened to the bracket using at least 3 screws M5 with 8 Nm torque.
The heater mounting screws are approved for bracket plate thicknesses of 1.5 to 3.0 mm.
See also Fig. 3: Example of a bracket.
Legend for Fig. 3:
9) Water heater
28) Bracket for heater
29) Vehicle body

4 Type label

The label referred to in Annex 7, paragraph 4, or a duplicate, must be positioned so that it can be easily read when the combustion heater is installed in the vehicle.
(Requirement from ECE-R 122, point 5.3.2.4.).
The type label must be positioned in a location where it is protected from damage.
(Requirement from ECE-R 122, Annex 9, point 3.3.1).
The non-applicable years should be removed from the type label, retaining the current year.
For an example, see also Fig. 18.

5 Installation example

Fig. 5 shows two installation examples of the heater in a vehicle.
Legend for Fig. 5:
1. Heat exchanger for vehicle heating system
2. Switch for fan of the vehicle heating system
3. Relay for vehicle blower
4. Control element
5. Fuse block in vehicle
6. Non-return valve with seepage hole
7. T piece
8. Motor vehicle engine
9. Water heater
10. Coolant pump
11. Coolant pump in vehicle
12. Radiator
13. Regulating valve
14. Exhaust silencer
15. Fuel pump
16. Combustion air intake line
17. Thermostat
18. Control unit
19. Wiring harness
20. Fuel line
21. Exhaust pipe
22. Coolant circuit

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6 Integration in the coolant system

6.1 Connection

Only thermostats which start to open at
< 65°C should be used in thermostat circuits.
The heater is connected to the vehicle cooling system as shown in Fig. 5.
To facilitate installation, the coolant inlet and outlet on the heater and the coolant pump are marked with arrow markings
(see Fig. 4).
Legend for Fig. 4:
23) Heat exchanger inlet
24) Heat exchanger outlet
30) Sensor cable
The amount of coolant in the circuit must be at least the volume specified in chapter 14 Technical data (page 49).

Coolant:

Mix ratio 50:50 (e.g. Glysantin®/water).
Permissible water/glycol (monoethylene glycol) mixes:

	Glycol [%]	Water [%]
Minimum	33	40
Maximum	60	67

The heater should preferably be integrated in the coolant system at the inlet of the vehicle heat exchanger.

Coolant running out of the system should be collected in a suitable container.

The coolant hoses supplied by Webasto should always be used. If this is not possible, the hoses must comply with DIN 73411 material class B as a minimum. The hoses should be installed without kinks and – for problem-free bleeding – as far as possible with an upward slope away from the heater.
Hose connections must be secured against slipping using hose clips.

The hose clips should be tightened with a tightening torque of 4 Nm.

Before initial start-up of the heater, or following replacement of the coolant, the cooling system should be bled carefully. The heater and lines should be installed in such a way that static bleeding is ensured.
Correct bleeding can be identified by the fact that the coolant pump is making very little noise.
Insufficient bleeding can lead to a malfunction resulting from overheating in heating mode.

6.2 Installing the coolant connection piece

The contact surfaces of the O-rings in the heater must be clean and must exhibit any kind of damage.
Before insertion into the heater, the O-rings must be wetted with suitable lubricant.
Position the O-rings in the openings of the heater. Insert the coolant connection pieces into the holding plate. Move the connection pieces into the required installation position.
Secure the holding plate with the coolant connection pieces onto the heater (thread-forming screw 5x15 mm, torque 7 Nm).
In order to enable automatic bleeding of the heater, the coolant outlet connection pieces must point upwards at an angle of 0° to 90°.

See Fig. 7: Installing the coolant connection piece.

6.3 Installing the coolant pump

The coolant pump must be mounted in the coolant circuit on the pressure side of the heater/heat exchanger inlet, see Chapter 5 Installation example (page 38)), Fig. 5.
Ensure the direction of flow of the coolant pump (arrow marking) is correct with respect to the vehicle coolant circuit.
The installation position of the coolant pump must be chosen so that the coolant pump is self-bleeding. The air volume contained in the coolant pump must be able to escape upwards independently via the connection pieces. See Fig. 6: Installation positions for coolant pump.

6.4 Inspection

Once the heater and all coolant-carrying components have been installed, the entire coolant system should be checked for leaks at the system pressure specified by the vehicle manufacturer.
See Chapter 14 Technical data (page 49).

7 Fuel integration

7.1 General

The fuel filler must not be situated in the passenger compartment and must be provided with an effective cap to prevent fuel spillage.
(Requirement from ECE-R 122, point 5.3.3.1.).
In the case of liquid fuel heaters where the fuel supply is separate from that of the vehicle, the type of fuel and its filler neck must be clearly labelled.
(Requirement from ECE-R 122, point 5.3.3.2.).
The fuel line is divided into an intake and a pressure line. Here, the intake line forms a connection between tank and fuel pump, and the pressure line forms a connection between fuel pump and heater.
Information about the fuel take-off point and permissible line lengths can be found in Fig. 12 and the tables.

Intake side:

D_1: Inside diameter of fuel line = 2 mm.

H_1: Distance from tank filling level - fuel pump (tank **above** fuel pump [m])

S_1: Distance from tank filling level - fuel pump (tank **below** fuel pump [m])

l_1: Length of fuel line

P_1: Relative fuel pressure at the take-off point.

Pressure side:

D_2: Inside diameter of fuel line = 2 mm.

H_2: Distance from heater - fuel pump (heater **above** fuel pump [m])

S_2: Distance from heater - fuel pump (heater **below** fuel pump [m])

l_2: Length of fuel line

Maximum values [m]:

Length of intake pipe l_1 [m]	max. 5
Length of pressure pipe l_2 [m]	max. 10
Total length of fuel line $l_1 + l_2$ [m]	max. 12
Height difference from heater - fuel pump (heater **above** fuel pump) H_2 [m]	max. 3
Height difference from heater - fuel pump (heater **below** fuel pump) S_2 [m]	max. 1

For ADR only:
EX/II, EX/III, AT, FL and OX vehicles: see chapter 3.2 Installing the heater (page 37).
The legal requirements of the ADR for fuel tanks must be observed; see ECE-R 122, Annex 9, point 3.

7.2 Integration in vehicle tank

Fuel must be extracted from the vehicle tank or a separate tank (see Fig. 8 and 10).
See also Chapter 5 Installation example (page 38).
The safeguarding measures specified by the vehicle manufacturer must be observed.

After sawing off, deburr the interface to the tank extracting device and remove fragments of metal.

Fig. 10: Extracting fuel using tank drain plug.
Legend for Fig. 10:
35) Sealing ring
36) Fuel tank
Fig. 8: Webasto tank extracting device.
Legend for Fig. 8:
33) Tank extracting device
34) Fuel tank
Use tank extracting device only with metal fuel tanks. Hole diameter 25 mm.

To Fig. 8:
Tank fitting or fuel tank must be manufactured from sheet metal.

7.3 Fuel line

Since it is not usually possible to ensure that the line is installed with a gentle slope, the internal diameter must not exceed a specified dimension. Above an internal diameter of 4 mm, air or gas bubbles start to collect, which lead

to malfunctions if the lines are installed with a sag or a droop. The specified diameters make sure that no troublesome bubble formation occurs.

Ensure lines are free of burrs and do not crimp.

7.3.1 Installing lines

When installing the fuel line make sure that it is kept as short as possible. See Chapter 7.1 General (page 40).
The fuel line must be protected against damage (e.g. stone chips) in all areas. It is essential that the fuel line is installed in cool areas to avoid bubbles being formed by the effect of heat. High fuel temperatures can cause the heater to malfunction. The line must therefore not be directed past heat sources (e.g. exhaust gas) and also not in the region of trapped heat zones.
Moreover, the fuel line should be installed with as much of an incline as possible from the tank to the heater.
Fuel lines must be secured in accordance with the state of the art so that sagging of the lines is avoided.
An abrasion guard should be fitted at transition points with sharp edges.

7.3.2 Pipe material

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

7.3.3 Connecting 2 lines using a hose

Fig. 9 shows the correct connection of fuel lines to a hose.
Legend for Fig. 9:
31) Hose clip
32) Air bubble

Make sure there are no leaks.

7.4 Fuel pump

The fuel pump is a combined delivery, metering and a shut-off system and is subject to certain installation criteria (see Fig. 11).
The Thermo Pro 50 Eco heater must only be operated with the fuel pump DP 42.

7.4.1 Installation location

Before installing the fuel pump, care must be taken to ensure that the permissible pressure at the take-off point is not exceeded. The pressure values are given in chapter 7.1 General (page 40).
The fuel pump must not be installed within the radiated heat range of hot vehicle components. If necessary, a heat shield should be fitted. The fuel pump should be preferably installed close to the fuel tank.
Permissible ambient temperature depending on the fuel used: see chapter 14 Technical data (page 49).

7.4.2 Installation position and fixing

The fuel pump must be secured with a vibration-damping mounting. The installation position is limited as shown in Fig. 11 to ensure effective automatic bleeding.
The arrow indicates the direction the fuel is flowing.

7.4.3 Fuel filter

Only a Webasto strainer is to be fitted if poor-quality fuel is used. Install vertically if possible, maximum deviation not exceeding 90°. See Fig. 13.

Pay attention to installation position and direction of flow.

7.5 Labels

A notice, indicating that the heater must be shut down before refuelling, must be affixed to the filler neck. [...]
(Requirement from ECE-R 122, point 5.3.3.3.).
Use the sticker supplied (see Fig. 14 for an example).
The sticker “Switch off heater when fuelling” should be attached in the region of the filler neck.

7.6 Cold-resistant fuels

When switching to cold-resistant fuels, the heater must be run in burner operation for approx. 15 minutes so that the fuel line and fuel pump are also filled with new fuel.

8 Combustion air supply

The air inlet must be so positioned or guarded that blocking by rubbish or luggage is unlikely.
(Requirement from ECE-R 122, point 5.3.5.2.).
Under no circumstances may the combustion air be taken from areas occupied by persons.
The fuel intake opening must be arranged in such a way that it cannot become clogged with dirt. It must not face in the direction of travel.
The take-off point for the combustion air must be positioned in a splash-proof, cool position above the wading line of the vehicle.
A combustion air intake line is required.
A combustion air line with a minimum length of 0.4 m and a minimum internal diameter of approx. 21.5 mm should always be used.
The maximum permissible length of the combustion air line is 1.0 m.
The combustion air line may have a number of bends, but the sum of the bend angles must not exceed 360°.
The smallest permitted bending radius is 45 mm.
The combustion air intake may not be routed above the exhaust outlet.

If it is not possible to install the combustion air intake line with a continuous incline from the outlet opening to the heater, a condensation drain hole with a diameter of 4 mm must be installed at the lowermost point.

When installing the heater in the vicinity of the vehicle fuel tank in a common installation space, the combustion air intake must come from the open air and the exhaust gas must be expelled to the open air. Through holes must be made splash-proof.
If the heater is in an enclosed casing, a ventilation opening is required. This opening should be at least twice the diameter of the combustion air intake line. If the temperature in the casing exceeds the permissible ambient temperature for the heater, see chapter 14 Technical data (page 49), the ventilation opening must be enlarged accordingly.

8.1 Combustion air intake silencer

The permissible installation position of the combustion air intake silencer is pointing downwards at an angle of between 0° and 90° (see Fig. 15).
Legend for Fig. 15:
37) Combustion air intake line
38) Combustion air intake silencer
39) Mounting clip

8.2 Notes on installation

Screw the combustion air intake line (max. 1 m long) to the combustion air intake connection piece of the heater.

The intake opening must be fitted in such a way that intake of exhaust gases is not possible.

9 Exhaust system

9.1 Exhaust pipe

The exhaust pipe (internal diameter 22 mm) can be installed with a number of bends (totalling 270°, smallest bend radius 50 mm). The total pipe length must be between 0.5 and 3 m.
The pipes approved by Webasto must be used for the exhaust pipe.

9.2 Exhaust silencer

The exhaust silencer should preferably be installed in the vicinity of the heater and must not be installed in the vicinity of the combustion air intake.

When installing the exhaust silencer, care must be taken to ensure that the condensation can escape through the condensation drain hole in the silencer.

Fig. 16 shows the exhaust silencer.
Fig. 5 (item 14) shows the exhaust silencer in the installed position.

9.3 Notes on installation

The exhaust silencer and the exhaust pipe may not be secured to temperature-sensitive vehicle parts (e.g. brake line, electrical lines, vehicle control units, headlamps, underbody coating, plastic parts, etc.) and must be positioned at a suitable spacing from these of at least 20 mm.
The exhaust pipes should be adequately fixed in order to prevent vibrations while travelling.
We recommend that the exhaust system is installed so as to be splash-proof.
The exhaust pipe is secured to the heater using clamping clips.

Accumulations of condensation in the exhaust pipe must be discharged immediately. If necessary, a condensation drain hole may be fitted at the lowermost point.

Condensation drain holes must not blow onto temperature-sensitive vehicle parts.
The exhaust gas outlet must be located so as to prevent emissions from entering the vehicle through ventilators, heated air inlets or opening windows. (Requirement from ECE-R 122, point 5.3.4.1.).
The exhaust outlet must vent freely. It should not be directed towards vehicle parts. The exhaust outlet may not be in the area in which the wheels throw up matter.
Care must be taken to ensure that the exhaust outlet cannot be blocked and **cannot be damaged under any usage conditions**.
The exit of the exhaust pipe must not face in the direction of travel.
Attachment no further than 150 mm, measured from the exit of the exhaust pipe, is required to achieve the required angle of 90° ± 10°.
See Fig. 17: Exhaust outlet.
The exhaust pipe must continue for 10 mm after passing through the underbody cover.
For ADR only:
EX/II, EX/III, AT, FL and OX vehicles: see chapter 3.2 Installing the heater (page 37).
The legal requirements of the ADR for installing the exhaust pipe must be observed; see ECE-R 122, Annex 9, point 3.

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10 Electrical Connections

10.1 Connecting control unit/heater

The electrical connection of the heater is carried out as shown in Fig. 19* and Figs 20 to 25 (depending on control element).
Legend Fig. 19:

① Fuel pump
② Fan relay and fuse holder
③ Fan wiring harness
④ Heater
⑤ Coolant pump wiring harness
⑥ Fuel pump wiring harness
⑦ Main wiring harness
⑧ Coolant pump
⑨ Control element connection
⑩ Earth connection

*: Wiring harness included in the Thermo Pro 50 Eco installation kit

10.2 Connection when installing Thermo Pro 50 Eco-ADR in a vehicle for transporting dangerous goods (ADR)

EX/II, EX/III, AT, FL and OX vehicles:
The combustion heater shall be switched on manually. Programming devices shall be prohibited.
(Requirement from ECE-R 122, Annex 9, point 3.1.2.).
The requirements stipulated in Regulation ECE-R 122, Annex 9 – Combustion Heaters – must be additionally observed when installing Thermo Pro 50 Eco-ADR heaters in vehicles used to transport dangerous goods. The electrical connection is made as shown in the wiring diagram Fig. 19 or Fig. 20. Connect the electrical connection as shown in the wiring diagram (SmartControl (ADR) or on/off switch (ADR), see chapter 11 Wiring diagrams (page 45)).

If the auxiliary drive is present, the switch S7 must be installed in such a way that, when a pumping device is started up, the positive potential is connected to the corresponding input in the control unit.

If no earth is present at the control unit input X1/4 (auxiliary drive) via Y2 or H5 on switch-on, all ADR functions are inoperative.

After connecting the plus potential to the control unit input X1/4 (auxiliary drive on) or after the generator signal D+ stops, there is a brief run-on for 40 seconds and the control unit is then in the "ADR locking" operating mode.

In accordance with the ADR Regulations, heaters may only be started up with a special manually operated switch installed in the driver's cab.
The heater can thus only be started up using the instant heat button (wiring diagram on request).
The use of other timers in ADR vehicles is not permitted.

10.3 Installing and connecting the control elements

A clearly visible tell-tale in the operator's field of view shall inform when the combustion heater is switched on or off.
(Requirement from ECE-R 122, Annex 7, point 7.1).

Installing the control element: follow the Operating Instructions and Installation Instructions for the control element.

The heater can be connected (and switched on or off) using the following Webasto control elements:
- MultiControl (W-bus or analogue)
- ThermoCall TC4
- SmartControl (ADR) (W-bus or analogue)
- UniControl (ADR)
- On/off switch (ADR)

Connect the control element as shown in the wiring diagram, see chapter 11 Wiring diagrams (page 45)

10.4 Vehicle blower

The vehicle's heater blower is controlled using a relay or a relay with room thermostat.
Connect the electrical connection as shown in the wiring diagram, see chapter 11 Wiring diagrams (page 45).

10.5 Setting the control temperatures for the heater

If the signal "Motor on"/"Motor off" (terminal D+) is applied to control unit connector X1 pin 3, different control thresholds may be effective.

	Setpoint temperature at the sensor	Control pause	Switching back on following a control pause
“Motor on”	57°C	65°C	50°C
“Motor off”	72°C	80°C	65°C

If the signal terminal D+ is not applied, the temperatures correspond to those for “Motor off”.
For more information, please contact your Webasto dealer.

11 Wiring diagrams

The wiring diagrams show the possible connections for the heaters.
System wiring diagram for Thermo Pro 50 Eco and control element:

Figure	Wiring diagram	Page
20	MultiControl or SmartControl (with battery disconnector, W-bus operation)	7
21	MultiControl or SmartControl (analogue operation)	8
22	UniControl	9
23	ThermoCall TC4	10
24	SmartControl (ADR)	11
25	On/off switch (ADR)	12

Legend for system wiring diagrams: see paragraphs 11.1 to 11.6
Positioning of electrical component on the heater: see Fig. 19.

11.1 Cable cross-sections

Graphic	<7.5 m	7.5 – 15 m
———	0.75 mm²	1.0 mm²
- - - - - -	1.0 mm²	1.5 mm²
▬▬▬	1.5 mm²	2.5 mm²
═══	2.5 mm²	4.0 mm²
═══	4.0 mm²	6.0 mm²

11.2 Cable colours

Abbreviation	Colour	Abbreviation	Colour
bl	blue	or	orange
br	brown	rt	red
ge	yellow	sw	black
gn	green	vi	violet
gr	grey	ws	white

11.3 Legend to wiring diagrams

No.	Description	Remarks
A1	Heater	Thermo Pro 50 Eco
A2	Control unit	-
A4	ThermoCall	TC4 Entry or TC4 Advanced
A5	W-bus temperature sensor	Optional, for TC4 Advanced only
ATS	Exhaust gas temperature sensor	PT2000
B4	Room thermostat	Optional
BA	Function display (switch S4)	Light 0.15 W to max 2 W
BM	Burner motor	Combustion air fan
DP	Fuel pump	Fuel pump for heater
F1	Fuse 20A	Blade fuse DIN 72581-3
F2	Fuse 1A	
F3	Fuse 20A	
FZG	Vehicle blower	-
GS	Glow plug	-
H1	Symbol on display	-
H2	LED (green, blue, white, red)	Operation indicator, Ready indicator, ON indicator, fault list
H5	Bulb/LED	ON indicator, pumping device (max. 500 mA)

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No.	Description	Remarks
H8	LED green (in Item S9)	ON indicator, operating indicator
K5	Relay with free-wheeling diode	Vehicle blower
P	SmartControl or Multi-Control	(W-bus)
P1	SmartControl	(W-bus)
P2	UniControl	(W-bus)
S4	Switch	ON/OFF
S5	Switch	Auxiliary drive / pumping device
S6	Switch, 1 or 2-pin	Disconnector
S7	Battery disconnector (BTS)	Electronically controlled disconnector (max. 500 mA)
S9	Pushbutton	ThermoCall TC4
S12	Pushbutton	External Quick Heating button (optional)
UEHS	Overheating protection	Sensor on heat exchanger
UP	Coolant pump	-
V1 / V2	Diode	Min. 500 mA (optional, not included in wiring harness)
V3	Diode	Connection to MultiControl / SmartControl / UniControl analogue (optional)
WTS	Coolant temperature sensor	Coolant temperature in coolant circuit
X1-X6	Plug connection	To Item A2
X7	Plug connection	To item UP
X10	Plug connection	W-Bus, MultiControl / SmartControl / UniControl connection, Telestart (12 V only), ThermoCall or diagnostics
X11	Plug connection	To item DP
X12	Plug connection	To item P or P1 or to A4
X15	Plug connection	W-bus temperature sensor connection
X16	Plug connection	To item A5 (optional)
X17	Plug connection	To Item A4
X20	4-pin plug connection	To Item S4 or connection to MultiControl / SmartControl / UniControl analogue
X21	4-pin plug connection	To Item A4
X31	10-pin plug connection	To Item P2
Y2	Solenoid valve / pump	Auxiliary drive / pumping device

11.4 Legend for comments

No.	Remarks
①	Temperature codes: Signal D+, see chapter 10.5 Setting the control temperatures for the heater (page 44)
③	Fuse for vehicle blower (fuse present in vehicle)
④	Switch for vehicle blower
⑤	Butt connector for fuel pump, crimp and shrink-fit on installation
⑥	Wiring harness
⑨	Optional extension available (connection to plug connection X10)
⑩	MultiControl / SmartControl / UniControl connection, Telestart (12 V only), ThermoCall or diagnostics via W-bus
⑪	MultiControl / SmartControl / UniControl connection or switch (analogue)
⑰	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.
⑱	Connection to terminal 30: Continuous heating mode is possible with ignition switched off.

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For more connecting possibilities see the combinations matrix control elements: https://dealers.webasto.com

11.5 Legend for X1 connector, 10-pin

No.	Remarks
1	Input, switch-on signal (ON/OFF)
2	W-bus
3	Terminal D+
4	Auxiliary drive
5	Output, fuel pump
6	Output, vehicle fan relay
7	Output, battery disconnector afterrunning signal
8	Operating indicator/error code output
9	Not used
10	Not used

11.6 Legend for X31 connector, 10-pin

No.	Designation	Remarks
1	Connector 31 (Vehicle)	Battery -
2	W-bus	Data link for heater
3	Switch output	Analogue switch-on signal for the heater
4	Switch input	Pushbutton, analogue Switch-on by a temporary earth
5	Connector 30 (Vehicle)	Battery +
6	Setpoint sensor -	Temperature set point (only for analogue air heaters)
7	Setpoint sensor +	
8	-	-
9	Connector 58 (Vehicle)	Illumination (dashboard illumination)
10	Connector 15 (Vehicle)	Ignition positive

11.7 MultiControl / SmartControl / UniControl initial start-up

The MultiControl / SmartControl / UniControl control elements can optionally be connected in analogue or W-bus (Webasto bus system) mode. Two interfaces are provided in the wiring harness for this purpose.

- W-bus to connector X10
- Analogue to connector X20

It is only possible to incorporate multiple control elements in the same mode. Connection of multiple control elements in different modes (W-bus/analogue) is not possible.

Thermo Pro 50 Eco with SmartControl, MultiControl or UniControl:

W-bus	Analogue	UniControl	SmartControl	MultiControl MAR/RV TT	MultiControl MAR/RV ATE	MultiControl HD	MultiControl Car	Selection of heater from menu (on initial start-up)
✓		✓	✓	✓	×	✓	×	Thermo Pro 50/90
	✓	✓	✓	✓	×	✓	×	Thermo Pro 50/90 HS

✓ : Possible selection

× : Not supported

12 Initial start-up

- Observe the safety information given in the operating instructions!.
- Carefully read the operating instructions before operating the heater.

Carefully bleed the coolant circuit and the fuel supply system after installing the heater. The vehicle manufacturer's specifications should be followed.
It is useful to operate the heater coolant pump for assistance when bleeding; this can be actuated via the "Component test" function in the Webasto Thermo Test computer diagnostics.
Before initial start-up of the heater, the coolant temperature should be < 60°C since the heater does not commence burner operation at high engine temperatures.
Carry out the initial start-up with Webasto Thermo Test computer diagnostics.
Pre-deliver fuel for the heater with Webasto Thermo Test: select the “Fuel priming” button and fill the line until fuel is present at the heater.
Delivery quantity of fuel pump DP 42 Diesel: 115 ml/(h * Hz) (+/- 10%).
That is 0.032 ml per stroke at a clock frequency of 1 Hz.
Example:
Delivery rate of diesel at a fuel pump frequency of 9.8 Hz and a delivery time of 180 s: 50.7 to 62 ml
The CO2 setting is not necessary for initial start-up since the heater has been preset in the factory. The detailed procedure for setting CO2 is described in the service manual.
During the test run of the heater, check all coolant and fuel connections for leaks and tight fit. If the heater encounters a malfunction during operation, perform the troubleshooting procedure to locate the fault.

Fuel pump DP 42: max 10V
Operating voltage range 8-10V

13 Malfunctions

Detailed fault localisation and troubleshooting is included in the Thermo Pro 50 Eco service manual.

14 Technical data

Tolerances:
If no limit values are specified, the technical data below will refer to the usual heater tolerances of ±10% at an ambient temperature of +20°C and at the rated voltage.

14.1 Electrical components

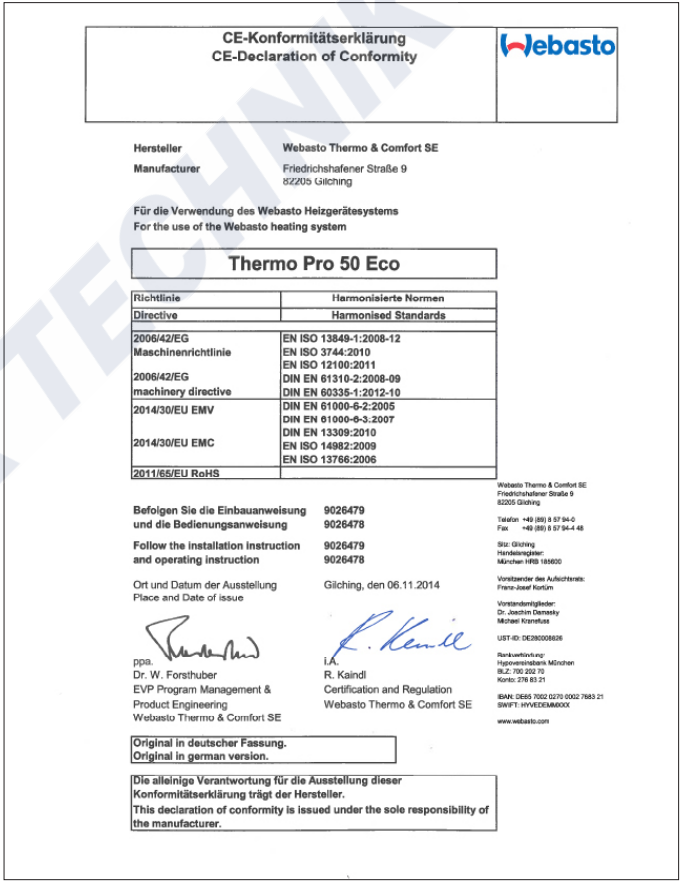
Control unit, motor for combustion air fan and coolant pump, glow plug, switch are designed for either 12 volt or 24 volt. The components thermal relay, temperature sensor, fuel pump and exhaust gas temperature sensor are the same for the 12 V and 24 V heaters.

14.2 Fuel

The diesel fuel in accordance with DIN EN 590 specified by the vehicle manufacturer must be used.
The Thermo Pro 50 Eco device is also approved for use with B20-B30 diesel conforming to DIN EN 16709.
There are no known adverse effects of using additives. If fuel is taken from the vehicle fuel tank, follow the additive instructions issued by the vehicle manufacturer.
Other fuel compatibility on request.

14.3 Technical data for coolant pump

Model	U4847 Econ 24 V
Volume flow with back pressure > 14 kPA	approx. 500 l/h
Rated voltage	24 Volt
Operating voltage range	16 to 32 Volt
Rated power consumption	≤ 18 W
Dimensions of coolant pump	Length max. 109 mm Diameter 48.5 mm
Weight	Approx. 0.3 kg



CE-Konformitätserklärung
CE-Declaration of Conformity

Webasto

Hersteller / Manufacturer: Webasto Thermo & Comfort SE, Friedrichshafener Straße 9, 82205 Gilching

Für die Verwendung des Webasto Heizgerätesystems
For the use of the Webasto heating system

Thermo Pro 50 Eco

Richtlinie / Directive	Harmonisierte Normen / Harmonised Standards
2006/42/EG Maschinenrichtlinie / 2006/42/EG machinery directive	EN ISO 13849-1:2008-12 EN ISO 3744:2010 EN ISO 12100:2011 DIN EN 61310-2:2008-09 DIN EN 60335-1:2012-10
2014/30/EU EMV	DIN EN 61000-6-2:2005 DIN EN 61000-6-3:2007 DIN EN 13309:2010
2014/30/EU EMC	EN ISO 14982:2009 EN ISO 13766:2006
2011/65/EU RoHS	

Befolgen Sie die Einbauanweisung und die Bedienungsanweisung: 9026479 9026478
Follow the installation instruction and operating instruction: 9026479 9026478

Ort und Datum der Ausstellung / Place and Date of issue: Gilching, den 06.11.2014

ppa. Dr. W. Forsthuber, EVP Program Management & Product Engineering, Webasto Thermo & Comfort SE

i.A. R. Kaindl, Certification and Regulation, Webasto Thermo & Comfort SE

Original in deutscher Fassung.
Original in german version.

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This declaration of conformity is issued under the sole responsibility of the manufacturer.

Webasto Thermo & Comfort SE
Friedrichshafener Straße 9
82205 Gilching
Telefon +49 (89) 8 57 94-0
Fax +49 (89) 8 57 94-4 48
Sitz: Gilching
Handelsregister: München HRB 185600
Vorsitzender des Aufsichtsrats: Franz-Josef Kortüm
Vorstandsmitglieder: Dr. Joachim Damasky, Michael Kranefuss
UST-ID: DE280008826
Bankverbindung: Hypovereinsbank München
BLZ: 700 202 70
Konto: 276 83 21
IBAN: DE85 7002 0270 0002 7683 21
SWIFT: HYVEDEMM00X
www.webasto.com

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Heater		Thermo Pro 50 EcoD 24 V
Type approval	ECE R122 (Heating)	E1 00 0471
	ECE R10 (EMC)	E1 05 7609
Design		Water heater with vaporising burner
Heat flow max. [kW]		5.0
Heat flow over control range [kW]		2.5 to 5.0
Fuel		Diesel DIN EN 590 Diesel B20-B30 DIN EN 16709
Fuel consumption over control range +/- 10% (max.) [l/h]		0.3 to 0.65
Rated voltage [V]		24
Operating voltage range [V]		20 to 31
Rated power consumption without coolant pump and vehicle blower over control range [W] (max.) ± 10 %		28 to 46
Permissible ambient temperature (operation/storage)	Heater (incl. Control unit) [°C]	–40 to +80 / –40 to +120
	Fuel pump [°C]	–40 to +30 / –40 to +90
Max. combustion air intake temperature [°C]:		+50
Permissible working pressure of coolant [bar]		2.5
Minimum volume in coolant circuit [l]		4.0
Coolant specification		See Chapter 6 Integration in the coolant system (page 39)
Minimum volume flow for heater [l/h]		250
CO2 in exhaust gas (permitted function range) [Vol %]		8 to 12
Heater dimensions	Length [mm]	218
	Width [mm]	91
	Height [mm]	147
Weight [kg]		2.2

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Die Telefonnummer des jeweiligen Landes entnehmen Sie bitte dem Webasto Servicestellen-Faltblatt oder der Webseite Ihrer jeweiligen Webasto Landesvertretung.

In multilingual versions the German language is binding.
The telephone number of each country can be found in the Webasto service center leaflet or the website of the respective Webasto representative of your country.

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