

# Cool Top 23 RT-E

## Air Conditioner Roof Top Unit



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# 1 Introduction

Improper installation or maintenance of the rooftop parking air conditioner may cause adverse consequences, potentially resulting in damage to vehicle components.

To install and maintain a rooftop parking cooler, you need Webasto training courses, corresponding technical documents, professional tools, and special equipment. Only original Webasto accessories are allowed.

Refrain from performing any installation tasks and/or maintenance of the product before you have completed Webasto training, without the corresponding qualification for working on air conditioning systems, or without the necessary technical documentation, tools and outfits. In particular, you must comply with the warnings and notes in the installation and operation instructions (this document) for this product.

**Note:**

- To ensure improved comfort, use the vehicle’s original air-conditioning system to cool down the cabin before starting the parking cooler for stationary use.
- Make sure that the capacity of the vehicle battery is at least 180 Ah. Otherwise, power shortage may happen and cause discomfort.
- Do not clean the vehicle or expose it to rain for at least 4 hours after installation. This allows the sealant to dry sufficiently.

# 2 General Product Information

All components are integrated into a single unit that is located on roof openings to ensure pleasant airflow, and cabins temperatures irrespective of the existing air-conditioning system. Flat design, simple installation and two colors (white and red) are for you to select.



Fig. 1 Unit outline

# 3 Product Structure Overview

## 3.1 Outer unit



Fig. 2 Outer unit of parking cooler

1	Axial fans
2	Top cover

The material of the top cover is high-strength ABS, resistant to deformation and climate aging.



Fig. 3 Top cover

The dual-electrical brushless axial fans are energy-efficient, low-noise and long-life.

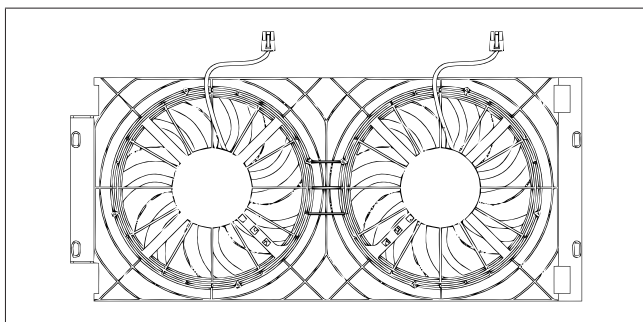


Fig. 4 Axial fans

## 3.2 Inner Unit

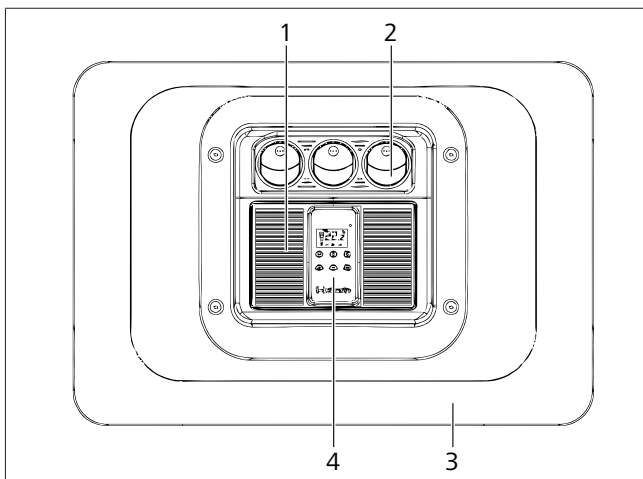


Fig. 5 Parking cooler - inner unit

1	Inlet
2	Outlet
3	Universal interior plate
4	Control panel

### 3.2.1 Inlets

Big airflow inlets with minimal noise.

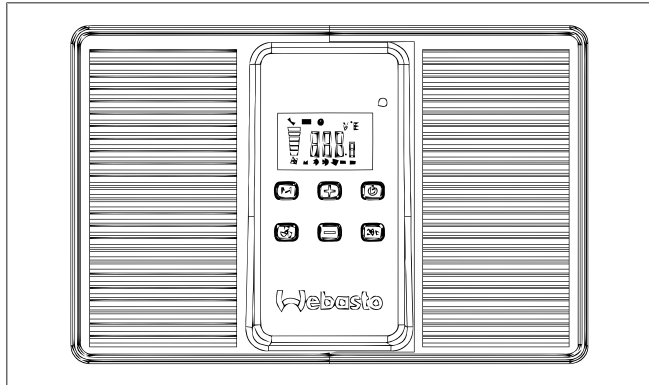


Fig. 6 Inlets

### 3.2.2 Outlets

The unit features three outlets with a wide airflow direction rotating range that provide convenient air distribution for users.

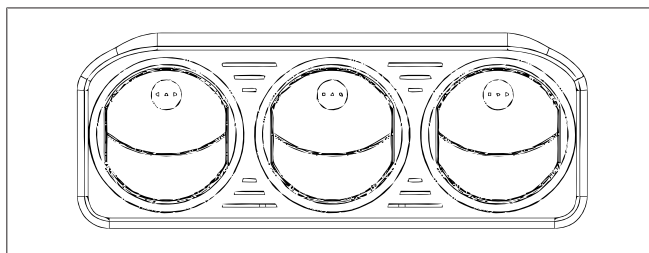


Fig. 7 Outlets

### 3.3 Interior plate

The material of the universal interior plate is also ABS with high strength, resistant to deformation and climate aging.

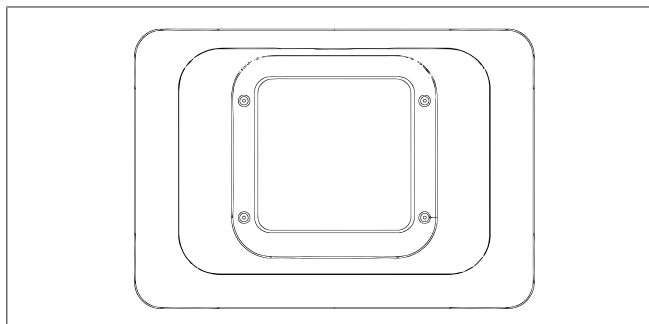


Fig. 8 Universal interior plate

### 3.4 Control panel

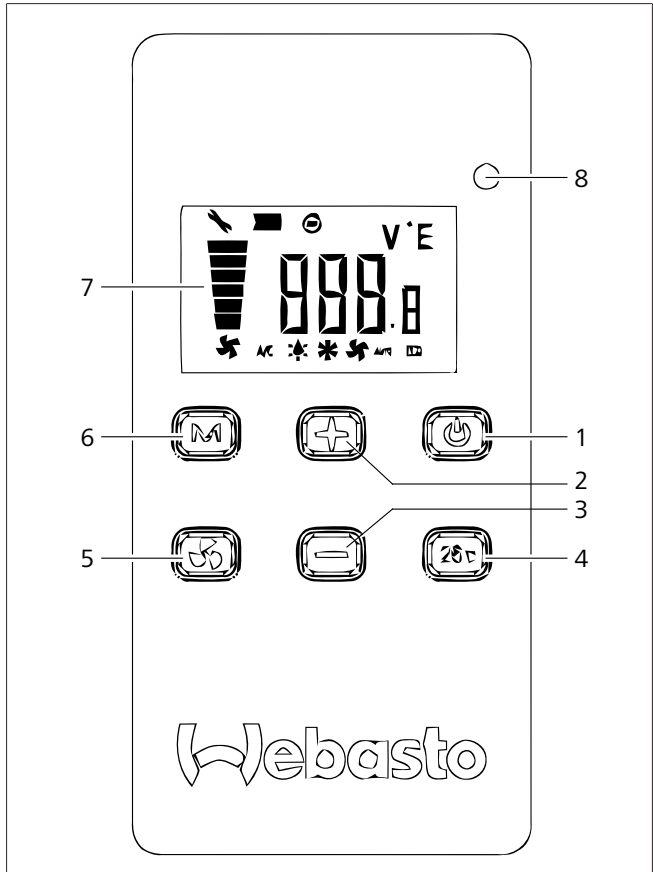


Fig. 9 Control panel

1	On/Off button	Press to switch the Cool Top 23 RT-E <b>On</b> or <b>Off</b> .
2	Temperature "+" button	Press to increase by 1 °C.
3	Temperature "-" button	Press to decrease by 1 °C.
4	Auto 26 °C button	Press to enable automatic management to 26 °C.
5	Airflow button	Press to cycle through 5 different airflow levels.
6	Mode button	Press to switch between <b>Power</b> , <b>Ventilation</b> , <b>Auto</b> and <b>Eco</b> mode
7	Display window	Shows: <b>set temperature</b> , <b>airflow</b> , <b>voltage</b> , <b>error codes</b> and <b>ambient temperature</b> .
8	Infrared signal	Shows reception of an infrared signal from the remote controller.

#### 3.4.1 Low-voltage protection

To set the low-voltage protection function:

Long press the "26 °C" button until the screen flashes.

Adjust the low-voltage cut-off value using the Temp "+" and "-" buttons. The default value is 21 V, ranging from 18 – 23 V).

Long-press the "26 °C" button again for 5 s.

#### Low-voltage recovery

After the air conditioning battery has triggered a low-voltage protection condition, low-voltage protection will be automatically disabled if:

- the battery voltage is above or equal to 25.5 V or
- starting the vehicle, to charge the battery, increases the battery voltage to over 25.5 V

To maximize its usage time, Webasto recommends using the battery after it is fully charged.

## 4 Remote control

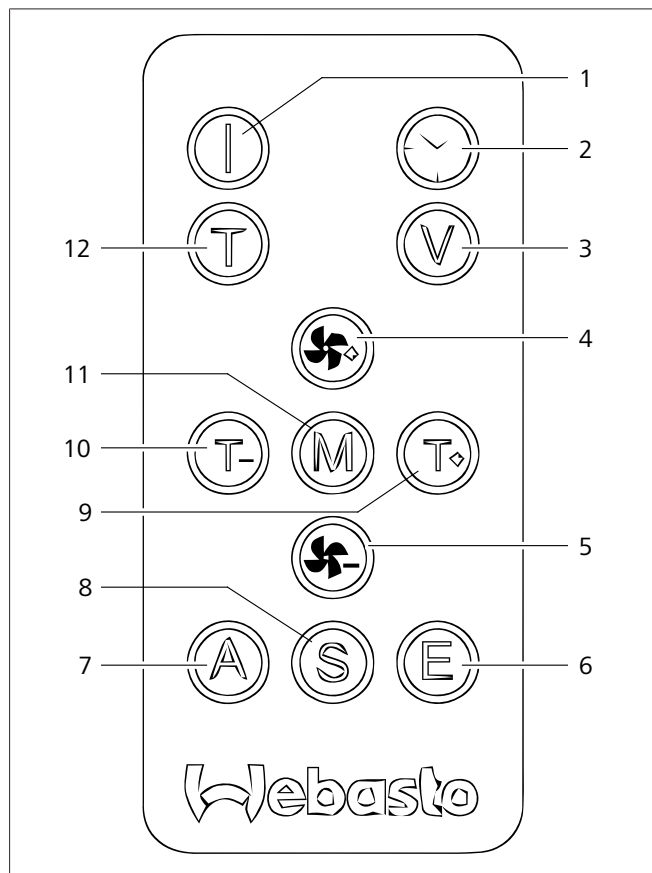


Fig. 10 Remote control panel

1 On/Off	7 Auto mode
2 Timer	8 Power mode
3 Voltage query	9 Temp "+"
4 Airflow "+"	10 Temp "-"
5 Airflow "-"	11 Mode
6 Eco mode	12 Temp query

### Modes:

- **Auto mode** (Ⓐ) is preferred if the cabin temperature is below 30 °C. You can adjust the air volume according to your own needs in different modes. The above notes are for reference only.
- **Power mode** (Ⓑ) is used for fast cooling. In Power mode, the default airflow is the highest if set to manual adjustment. If the ambient temperature exceeds 35 °C and the cabin temperature is high, Power mode (Ⓑ) is the preferable setting for fast cooling, resulting in the highest airflow and the best cooling effect.  
  
Webasto strongly recommends to not use power mode for longer than 20 minutes. Long-time operation will significantly shorten the life of your product.
- **Eco mode** (Ⓔ) is used when resting or reading is preferred. In Eco mode, the compressor runs in low frequency, and airflow defaults to the lowest setting at manual adjustment.

## 5 Installation

**ATTENTION**  
The torque value requirements in the following steps are only applicable to this section, not the others.

### 5.1 Fixing holes selection

The roofs of the following vehicles need to be cut:

- Tianlong 2007/2010/2015 models,
- Delong M3000, F3000,
- Auman ETX,
- Hongyan GENLYON,
- C&C,
- Scania R/P series and trucks

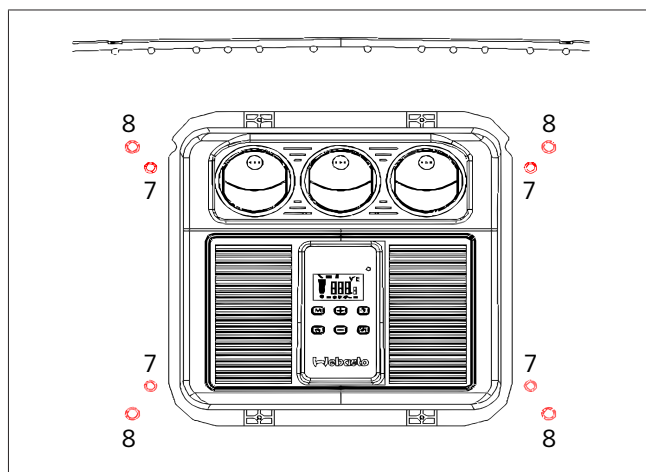


Fig. 11 Fixing holes selection

Note:

- Hole pattern 7 applies to the interior plate (4 x M6 nuts)
- Hole pattern 8 applies to the fixing brackets (4 x M8 nuts)

Trucks with small roof openings (such as Dayun) must use hole patterns 6 and 7.

Part name	Quantity	Hole	Tool	Comment
M8 nut	4	8(6)	Electrical screwdriver or wrench	Nuts with inner and outer threads
M6 nut	4	7		

Part name	Quantity	Hole	Tool	Comment
M8 x 90 screw	4	8(6)	Torque wrench	M8 x 90 Fully threaded screw
M8 flange nut				
M6 x 110 stud bolt	4	7		

Trucks with small roof opening (such as Dayun) should use hole patterns 6 and 7.

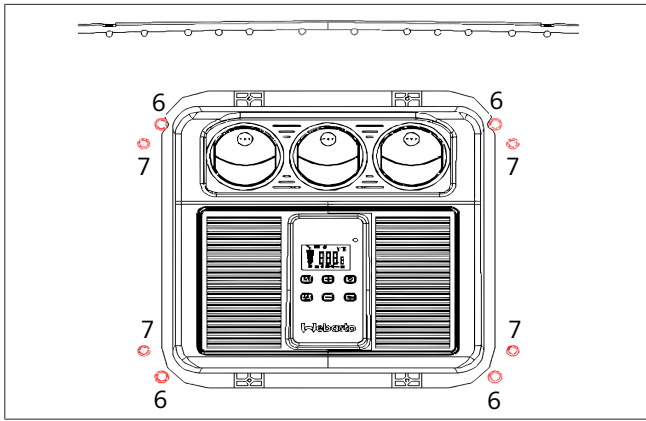


Fig. 12 Fixing holes selection

Note:

- Hole pattern 7 for interior plate (4 x M6 nuts)
- Hole pattern 6 for interior plate (4 x M8 nuts)

## 5.2 Fixing nuts and screws on the bottom plate

**Step-1:** Select installation holes based on truck models and fasten the corresponding M8 or M6 nuts (perpendicular to the base frame as shown below, if it is not perpendicular, cracks can appear, causing water leakage of the bottom plate) using an electric screwdriver or similar.

After installation, it can be leveled with the horizontal plane of the bottom plate.

Torque settings :

- M8 nuts (inner and outer threads):  $6 \pm 0.5$  Nm
- M6 nuts (inner and outer threads):  $4 \pm 0.5$  Nm

Special installation for trucks (see chapter 10, "Appendix 2 Special installation notes for exclusive vehicles" on page 10).

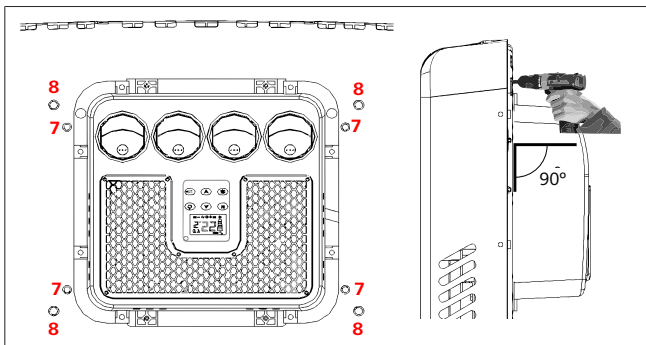


Fig. 13 Installation holes

**Step-2:** Manually insert the M8 x 90 screws into the corresponding thread holes in step one, then secure them with M8 flange nuts using a wrench. Next, fasten the M6 x110 screws in the same way. See the installation diagram below.

Torque value for M8 flange nut:  $10 \pm 0.5$  Nm.

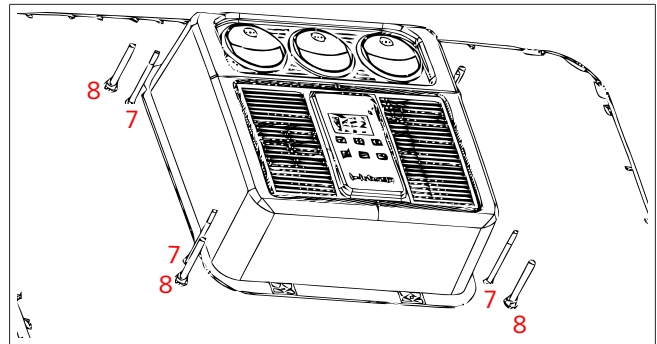


Fig. 14 Screw locations

## 5.3 Main assembly

**Step-1:** Dismantle the existing roof, clean the roof perimeter and remove dirt with a cloth, making sure that the sealing zone is dry with no dust.

Note: if there is no sunroof, the minimum opening size is:

- 500 mm (left and right)
- 400 mm (front and back)

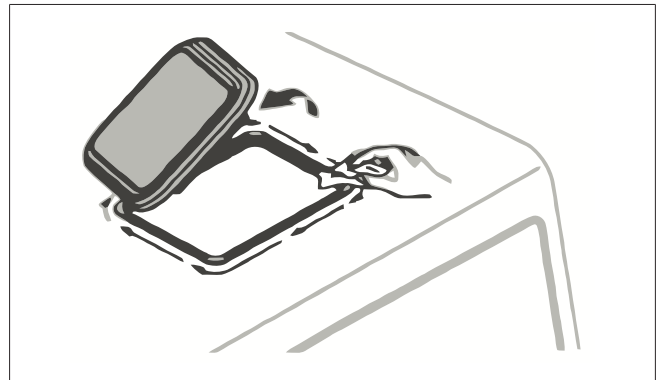


Fig. 15 Clean roof perimeter

**Step-2:** Paste the roof sealing sponge and glue on the outside and the upside of the foam (see chapter 5.4, "Sealing the roof hatch" on page 7).

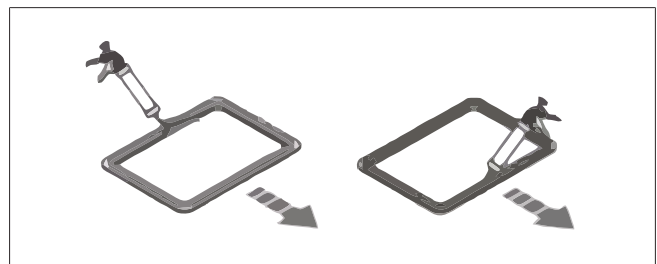


Fig. 16 Roof foam pasting and gluing

**Step-3:** Place the Cool Top 23 in the center of the roof opening (avoid any damage during installation).

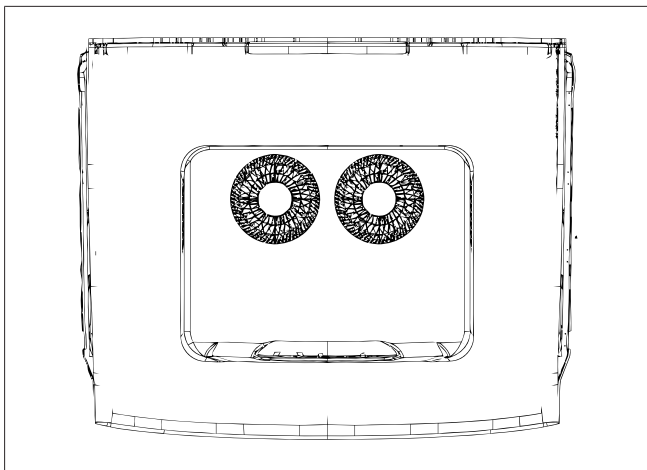


Fig. 17 Cool Top 23 located in the centre of the roof opening

**Step-4:** Attach the Cool Top 23 main assembly based on truck models.

For special installation details (see chapter 10.2, "Main assembly installation" on page 10).

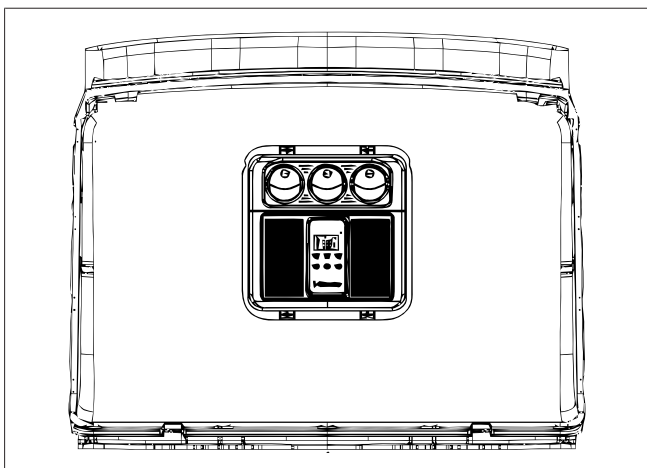


Fig. 18 Attaching the main Cool Top 23 assembly

**Step-5:** Install four M8 flat nuts 1 into the four M8 x 90 screws with hand, then put the washers 2 and the brackets through the screws, then fasten the brackets on both sides with four washers 4 and M8 flat nuts 3.

For the four M8 flat nuts 3, use an electric screwdriver or similar tools to tighten until the sponge pressure is 3-6 mm, then screw four M8 nuts 1 down to the surface of the brackets, and then further tighten the four M8 flat nuts 3, the torque for the M8 flat nuts 3 is  $3.5 \pm 0.5$  Nm.

Make sure that the brackets are fastened securely. If there is any interference with the roof (see chapter 5.7, "Fastening brackets, cutting and notes" on page 8).

Check for any interference with regard to the interior plate before moving on to the next step. If there is any issue (see chapter 5.6, "Fastening screws, cutting and notes" on page 8).

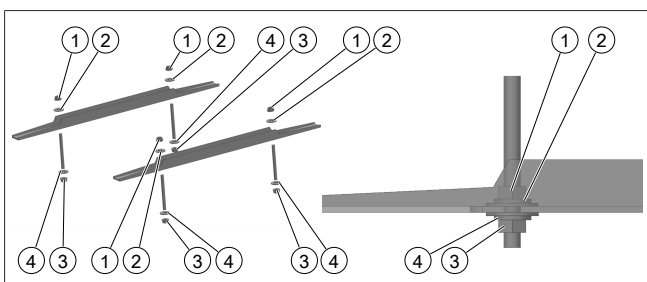


Fig. 19 Attaching brackets

**Step-6:** Attach the interior plate using the four M6 nuts and apply a torque value of  $0.8 \pm 0.5$  Nm.

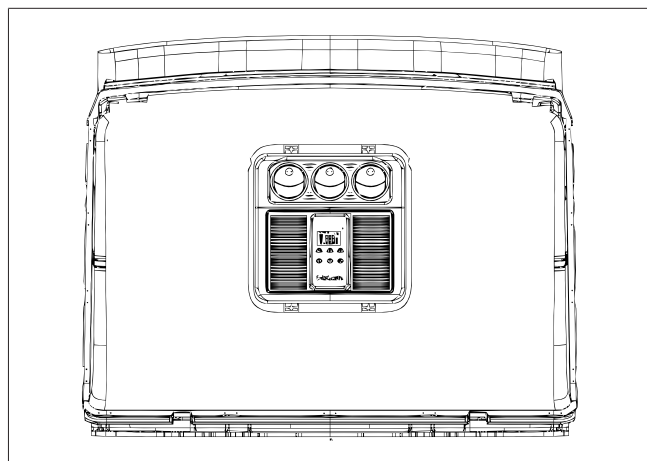


Fig. 20 Attaching the interior plate

**Step-7:** Install the power harness as described below.

Connect the power harness shown in Fig.21 using the cable bearers in accessories, avoiding any damage.

During the wiring layout, the power harness in the Cool Top 23 section fixing in the truck body while the other section fixing in the battery, avoiding any possible damage to the harness. **In case of cab rotation, disconnect the power harness in advance.**

**Step-8:** Connect negative and positive power harness to the batteries correctly and start the Cool Top 23.

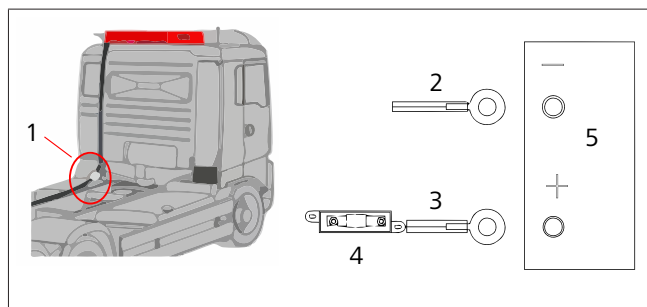


Fig. 21 Harness connection

1	Connector
2	Negative (black)
3	Positive (red)
4	60 A fuse
5	Battery

1. Connect the red harness end to the positive terminal end on the battery, and connect the black harness to the negative terminal end of the battery; do not use the ground electrode (GND) of the truck frame.
2. Disconnect the power harness from the engine starter to avoid a voltage overload.
3. Paste the sealing foam firmly in place to avoid any water leakage into the cab (see chapter 5.4, "Sealing the roof hatch" on page 7).

## 5.4 Sealing the roof hatch

### Roof sealing sponge installation and notes:

After confirming that the sponge can completely cover the edge of the sunroof, use a utility knife, such as 'Ib50h', to cut the sealing sponge obliquely, stagger obliquely by 1 cm, and then

squeeze and paste it as shown below; according to the actual installation; you can cut one or both sides obliquely. Make sure that the cutting edge is clean.

Remove any oil and dust from the outside of the sunroof, tear off the sealing sponge adhesive layer, and paste the sealing sponge on the side of the sunroof as shown below. You must apply the past cleanly, and press it flat and tight, without warping and deformation.

Apply waterproof sealant on the outside of the sunroof sealing sponge (according to the actual situation of the vehicle, the upper part of the sponge should also be filled with a sealant if necessary); at the same time, the cutting opening is also filled with sealant.

Install the sponge cushion pad and press it to the bottom of the sealing sponge as shown below.

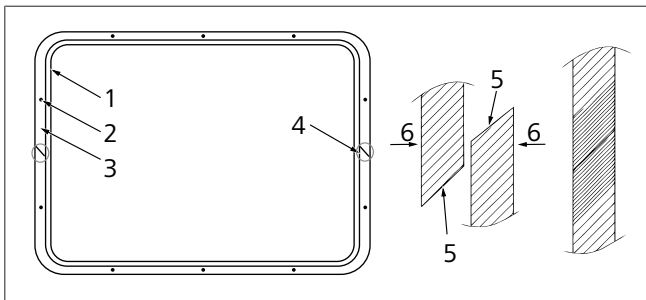


Fig. 22 Roof sponge cutting notes

1	Sunroof outer edge
2	Sponge cushion
3	Sunroof sealing sponge
4	Shear bevel
5	Oblique cutting
6	Staggered, 1 cm

### 5.5 Cutting the universal interior

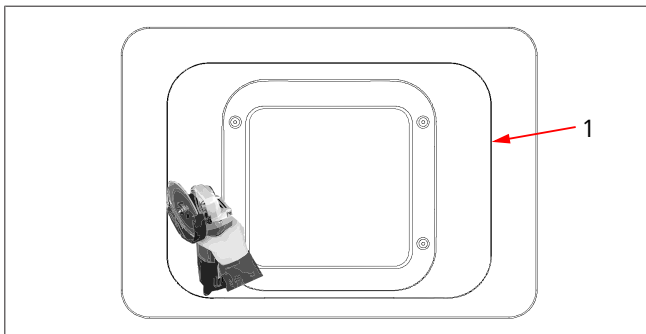


Fig. 23 Interior plate cutting diagram

1	Cutting line
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#### 5.5.1 Notes

Use Ib50h or an electrical grinder with cemented carbide saw blade to cut along the cutting line (groove position) of the interior plate. The cutting edge should be clean and de-burred.

### 5.6 Fastening screws, cutting and notes

M6 x 110 stud bolt cutting, installation, and precautions: The M6 x 110 stud bolt is used to fasten the interior plate. When installing, screw the 20 mm long end of the screw into the M6 inner and outer nut, and then fasten the interior plate at 40 mm on the other end. Select the cutting size based on the actual installation conditions.

### Cutting the M6 x 110 stud

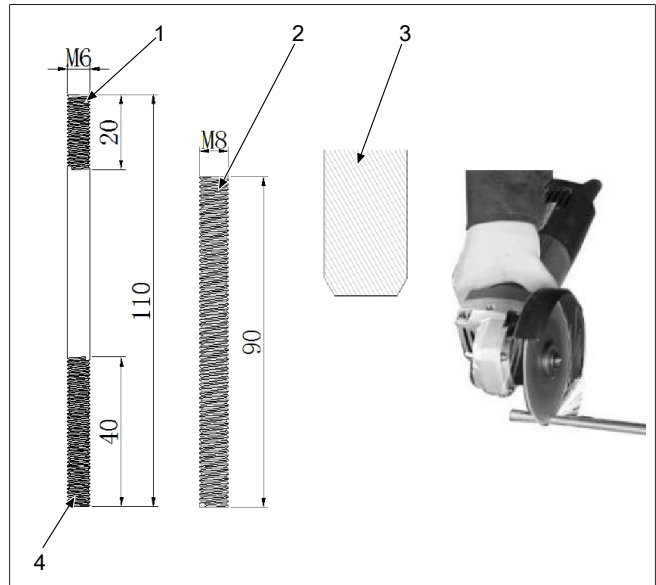


Fig. 24 Cutting stud screws

1	Cutting of M6x110 stud
2	M8x90 full tooth bolt cutting
3	Chamfer cutting end
4	Cutting

Use a grinder for cutting and deburring the chamfer on the cutting end.

#### M8 x 90 screws cutting and notes:

The M8 x 90 fully threaded bolt is used to fasten the bracket. When installing the bracket, measure the length first, and then determine the cutting length based on the actual installation requirements.

Part name	Screw thread length	Installation position	Tool	Comment
M8 * 90 Screw	90	M8 nut	Grinder	The cutting length must be in accordance with the actual situation.
M6 * 110 Stud bolt	20	M6 nut		
	40	Fastened universal interior plate	The M6 x 110 stud must be cut within the thread length of 40 mm	

### 5.7 Fastening brackets, cutting and notes

Verify the installation size before cutting. If the size is too small after cutting, you will not be able to install and secure the unit. Use a grinder to cut from both sides, and to chamfer and deburr the cutting end.

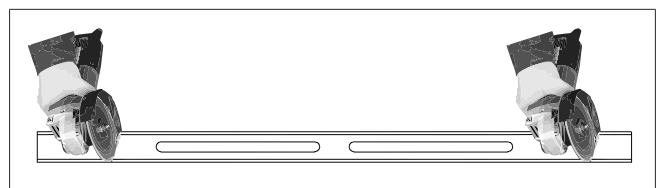


Fig. 25 Fastening the brackets cutting diagram



## 6 Error codes and troubleshooting

### 6.1 Failure analysis

Failure analysis of no cooling or poor effect:

- The power cord connection is too long and too thin, or poor connection at the connector.
- No refrigerant or insufficient refrigerant.
- Eco mode is used if the temperature is too high.
- The compressor or condensing fan does not work.
- The evaporator or condenser is dirty or blocked.

Common fault code processing method:

- The battery power is insufficient and under-voltage E2;
  - Check the battery for aging and replace it if necessary.
  - If the battery is not fully charged, it needs to be charged.
  - Connect the negative pole of the power line to the metal or to the generator and reconnect the wiring or harness.
- Pressure fault (system leakage) E4 ;
  - Refrigerant leakage or poor heat dissipation.
- Sensor fault E0 or E1;
  - Check whether the plug-in is loose and re-insert it tightly.
  - Sensor quality problem, replace the sensor.
- High current protection F6, electronic fan fault F7/F8;
  - Check the condenser heat dissipation, and whether the surface is dirty and blocked.
  - Check whether the terminal or plug-in of the power line is loose.
  - Check if the plug-in of the fan is loose and plug it in again.
  - Condenser fan failure, replace the fan.

Code	Description	Troubleshooting
E0	Inlet temp sensor fault	Check the sensor connector.
E1	Outlet temp sensor fault	Check the sensor connector.
E2	Low voltage	Check the battery or the harness.
E3	High voltage	Check the battery or the power.
E4	Pressure (system leakage)	Check for R134a leakage.
F0	Disconnected / Blocked compressor	Check if the cooling fan is working / check for a R134a overcharge.
F1	Compressor driver overheat	Check if the cooling fan is working / check if ambient temperature exceeds 55 °C,
F2	Compressor driver wire low voltage	Check harness for improper connection,
F3	Compressor driver overvoltage	Check wire for improper connection,
F4	Compressor driver phase absence	Check wire for improper connection.
F5	Driver output overload	Check wire for improper connection.
F6	Driver output over-current	Check if cooling fan is working / check if ambient temperature exceeds 55 °C,

F7	Cooling fan 1 fault	Check if cooling fan1 is working.
F8	Cooling fan 2 fault	Check if cooling fan2 is working.

Table 1: Error code table

To fix the above issues:

1. Turn off power.
2. After 5 minutes, turn the machine on again.  
If the fault has not disappeared, then refer to the Service Instructions or contact your nearest Webasto dealer. See also: <https://dealerlocator.webasto.com/en-int>.

## 7 Maintenance

To ensure normal operation of the air conditioner, it is critical that you observe routine maintenance procedures:

- If idle for a longer period of time, remove the positive and negative power lines at the battery end, pay attention to the sealing and prevent negative connection direct to ground to avoid battery damage caused by long-term electrification. The power line must be connected to the battery; connecting the negative directly to ground, or connecting to a generator is strictly prohibited).
- The air conditioner must be maintained every 3 months (clean the evaporator and condenser, check the internal and external circuits); depending on the specific working environments, such as dusty and high-temperature environment, shorten the maintenance cycle accordingly. Refer to table 7 of the Service Instructions for further product maintenance details.
- Webasto advises against installing generators, solar energy devices and any other external charging equipment.

## 8 Disclaimer

Webasto provides installation videos and installation instructions. Perform the installation strictly in accordance with the video and instructions. Failure to perform the installation in accordance with the installation video and instructions may result in human failure or damage and other accidents. You will bear the responsibility for the maintenance and material costs caused by non-compliance with these instructions. Webasto will not bear any responsibility.

You must pay attention to safety issues during the installation process, in case of personal safety issues occur, you must bear the responsibility.

If you change the air conditioning on your own, or if you use non-original replacement parts and components, you will bear responsibility for any damage caused to the air-conditioning equipment and for any personal safety issues. Webasto will not bear any responsibility.

## 9 Appendix 1 Accessories

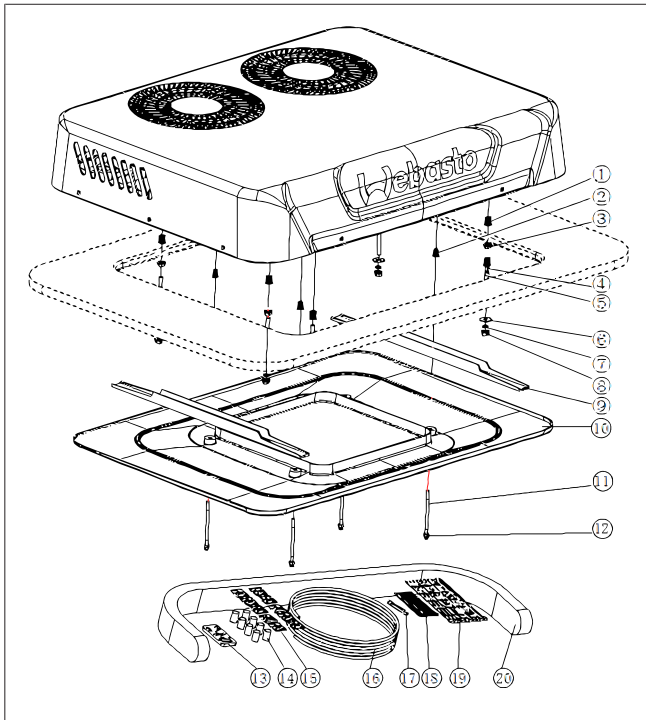


Fig. 26 Cool Top 23 RT-E accessories

No.	Part description	Quantity
1	M8 inner and outer tooth nut	6
2	M6 inner and outer tooth nut	4
3	M8 hexagon flange nut	6
4	M8 x 90 full-tooth screw	4
5	M8 x 60 full-tooth screw	6
6	Φ30 x Φ10.5 x 1.5 flat washer	6
7	M8 standard spring washer	6
8	M8 non-metallic flange lock nut	6
9	Air conditioner fastening bracket	2
10	Universal interior plate	1
11	M6 x 110 two heads screw	4
12	M6 galvanized nut	4
13	Remote control	1
14	Sponge damping pad	8
15	Cable bracket seat	10
16	Battery power cord assembly	1
17	S2 hexagon batch heads	1
18	4 x 150 cable bracket	10
19	8 x 200 cable bracket	10
20	Roof hatch sealing sponge	1

**Note** : installation manual and labels included in accessories.

## 10 Appendix 2 Special installation notes for exclusive vehicles

### Fastening nuts and screws for installation

Suitable models: Tianlong flagship, Hyundai Xcient, FAW J7, SINOTRUK Sitrak, Delong X3000 / X5000, JACK7, HOWO T5g, Man, Benz Actros and Auman GTL use hole patterns 1 and 7.

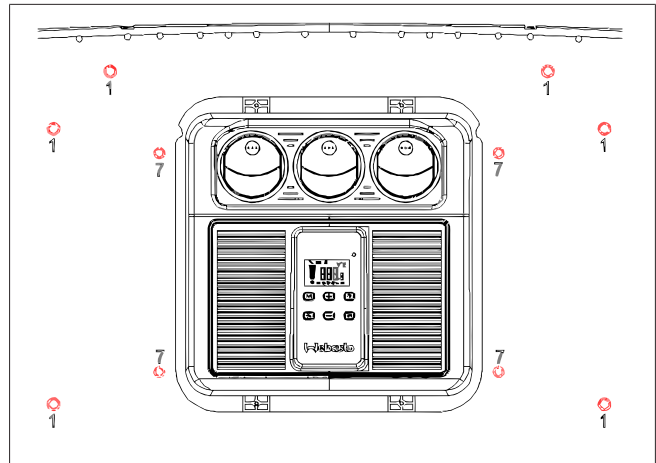


Fig. 27 Fastening hole patterns

Hole pattern 7 for interior plate (4 x M6 nuts)

Hole pattern 1 for installation of the body sunroof (6 x M8 nuts)

Part description	Quantity	Hole number	Comment
M8 nut (inner and outer threads)	6	1	For installation (see chapter 5.2, "Fixing nuts and screws on the bottom plate" on page 6).
M6 nut (inner and outer threads)	4	7	

### 10.1 Handling roof hatch holes

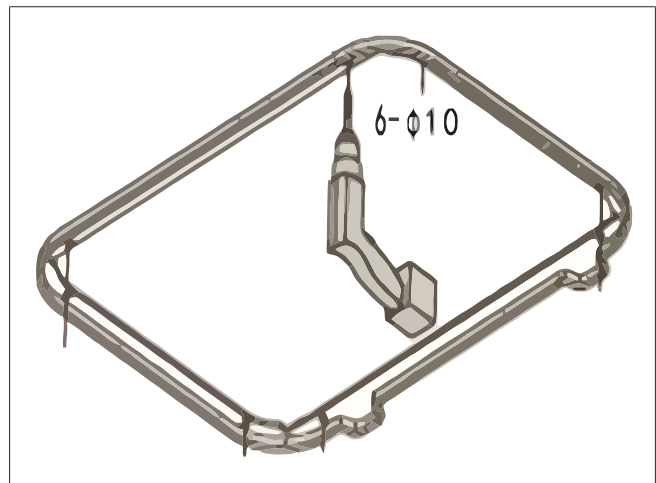


Fig. 28 Fastening hole position treatment of sunroof

1. Remove the sunroof from the original vehicle
2. Using an electric drill, enlarge the 6 holes of air conditioner number 1 to a diameter size of 10 mm, corresponding to the sunroof of the original vehicle.

### 10.2 Main assembly installation

To install the Cool Top 23 insert an M8 x 60 full screw and an M8 hexagon flange nut at the installation hole of the M8 internal and external nuts.

Install an M6 x 110 stud bolt at the installation hole of the M6 internal and external nuts (see chapter 5.3, "Main assembly" on page 6 for other installation instructions).

Part description	Quantity	Hole number	Comment
M8 x 60 screw	6	1	For installation (see chapter 5.2, "Fixing nuts and screws on the bottom plate" on page 6)
M8 flange nut	6	1	
M6 x 110 stud bolt	4	7	

To request this documentation in another language, please locate and contact your local Webasto dealer. 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. <https://dealerlocator.webasto.com/en-int>.  
To provide feedback (in English or German), please email: [feedback2tdt@webasto.com](mailto:feedback2tdt@webasto.com)

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Germany

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82205 Gilching  
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Technical website: <https://dealers.webasto.com>

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