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AIR CONDITIONER KAC 33/KAC 25



顶置空调
安装和使用说明书

CN

Roof Top Air Conditioner
Installation and Operating Instructions





EN

非常感谢您选购**阿雷纳**的制冷设备，在安装或使用该设备之前，请您仔细阅读此说明书。请将说明书保存在所有用户都可以找到的地方，以便随时查阅使用。如果该设备转让或者出售，请确保此说明书也交付给新用户，以便告知他们安装方法、使用和安全要求。

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1.0 安全符号说明

-  **危险！** 表示潜在的危险情况，会导致死亡或重伤。
-  **警告！** 表示潜在的危险情况，会导致轻伤或重度损伤。
-  **注意！** 表示潜在的危险情况，会导致财产损失。
-  **提示！** 产品操作的补充信息。


2.0 安全说明

请遵守车辆制造商和售后服务商提到的安全说明和规定。

以下情况造成的损坏，**阿雷纳**不承担任何责任：

- 错误装配或连接。
- 机械影响和过电压造成产品的损坏。
- 未取得制造商明确许可擅自改变产品。
- 用于此说明书之外的用途。

2.1 一般性安全说明

-  **警告！**
 - 该空调的安装和维修只能由熟悉风险和相关规定的人员进行，不当维修可能会造成严重的危险。
 - 该电气设备不是玩具。
 - 请将该电气设备远离儿童或体弱者，不要让他们在没有监督的情况下使用该电气设备。
 - 生理、感官、精神能力受限或者缺乏知识和经验而无法安全使用该电气设备的人，

在没有责任人监督或指导下不得使用该电气设备。

- 不要拆卸该空调的外壳，以防发生火情。如果发生火情，不要用水灭火，要使用许可的灭火剂。



注意！

- 该顶置空调必须安装牢固，防止坠落。
- 不要在靠近易燃液体或者封闭空间内使用顶置空调。
- 确保通风口附近没有存放或者安装易燃物品，应至少保持 50cm 的安全距离。
- 切勿将手插入通风口内或者将异物塞入顶置空调内。



注意！

- 只能按照预期用途使用该电气设备。
- 该顶置空调不适合于安装在农用或者建筑车辆上。
- 不要对该电气设备进行任何变更或者改造。
- 如果制冷回路发生故障，必须由专业的公司进行正确的检查和维修。制冷剂绝对不可以释放到空气中。



提示！

- 请和车辆制造商确认，在安装顶置空调后是否需要进行技术检测，以及车辆文件中填写的车辆高度是否需要变更。

2.2 操作安全说明



警告！

- 必须由专业人员进行电源线的连接。
- 安装或维护该电气设备时，一定要切断电源。



注意！

- 在穿过有锋利边缘的墙壁时，请使用穿线管铺设电缆线。

- 不要把松动或者弯曲的电缆放置在导电材料旁边。
- 只有在确定外壳和电线未损坏的情况下,才可操作该电气设备。

3.0 预期用途

该顶置空调是专为自行式房车、拖挂式房车和其它带有生活居住空间的车辆设计。

该顶置空调不适合于安装在建筑机械、农业机械或者类似的设备上,剧烈震动会造成顶置空调无法正常工作。

如果环境温度超过 52° C,请不要使用顶置空调,在极端温度下,顶置空调的性能会受到影响。

提示!

- 可以从说明书的技术描述和操作说明中查阅到顶置空调的更多信息。

4.0 技术描述

该顶置空调向室内输送凉爽或温暖的干燥空气。

该顶置空调可以通过控制面板上的按键或者遥控器操作。

提示!

- 顶置空调可以将车内温度降低到一定程度。温度取决于车辆类型、环境温度以及顶置空调的制冷能力。室外温度低于 16° C 时,顶置空调将不再制冷,只运行“送风”模式。

4.1 部件名称

顶置空调的制冷回路包含以下主要部件，详见第 25 页零部件明细表。

- **压缩机**

压缩机将使用过的制冷剂吸入并进行压缩，这就提高了制冷剂的压力和温度。

- **冷凝器**

内置液化器的工作原理与冷却器或热交换器类似，流经的空气吸收热量，热的制冷气体冷却变成液体。

- **蒸发器**

蒸发器将流经的空气进行冷凝和除湿，制冷剂吸收热量并蒸发。

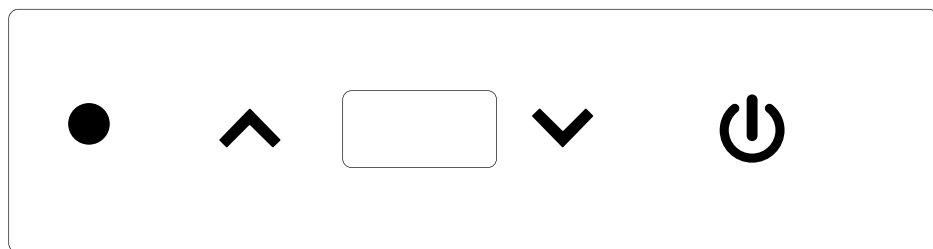
- **风机**

风机通过通风口将冷气吹入车内。

4.2 控制面板

控制面板位于顶置空调的出风口单元上。

包含以下控件和显示元素：



说明	
按键 	开启、关闭或者进入待机模式
按键 	温度调高
按键 	温度降低

4.3 遥控控制

通过遥控器控制顶置空调的所有设置。

遥控器可控制以下控件和显示元素：

说明

数字显示

时钟 **A18:88** AM PM

温度设置单位（目标值）摄氏度 **88**°C

模式 *     

风速等级  AUTO 

(* 有些功能不适用于该机型)

按键 

将顶置空调和遥控器调至开机状态或者待机模式

按键  MODE

选择运行模式

按键 

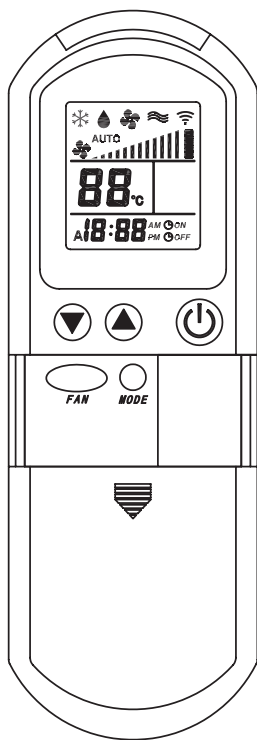
增加数值

按键 

降低数值

按键  FAN

选择风量的设置



4.4 工作模式

顶置空调包含以下工作模式:

空调模式	页面显示	说明
自动		根据制热或者制冷的需要，顶置空调自动将温度保持在 20°C 到 25°C 之间。
制冷		指定好温度和鼓风机的设置，顶置空调将室内温度降低至此。
制热		指定好温度和鼓风机的设置，顶置空调将室内温度升高至此。
送风		指定好风速等级，顶置空调将空气吹入室内。

提示

- 请使用符合国家规定的连接线。
- 在选择发电机容量时，必须考虑车辆的总用电量，以及发电机的功率会因高海拔和缺少维护而受损这些因素。
- 电路保护：务必使用漏电开关。

5.0 安装说明

注意！

- 请在开始安装和使用该产品前，仔细阅读此安装和操作说明。
- 由于不遵循本说明书引起的任何损失或伤害，制造商概不承担任何责任。
- 安装务必遵守国家电气规程、法规或行业规范。

- 未经阿雷纳的书面授权，该产品不得加装任何设备或附件。
- 该电气设备须由专业人员进行安装和维修。

5.1 选择安装位置

该顶置空调专用于安装在车顶上，在确定您的制冷需求时，应该考虑以下几点：

- 车辆尺寸。
- 车窗面积（面积越大，受热越多）。
- 车厢板和车顶隔热材料的厚度和保温性能。
- 客户使用车辆的地理位置。
- **通用位置：**将顶置空调安装在现有车顶通风口上。

拆除通风口后，通常切割一个 $362*362\text{mm}\pm 2\text{mm}$ 或 $400*400\text{mm}\pm 2\text{mm}$ 的开口。

- **其他位置：**当车顶没有通风口或者是有更理想的位置时，建议采取以下做法：
 - a. **安装一台顶置空调时：**应该安装在中心点略靠前的位置（从前头看），并处于左右两端的中心点（见图 01。）。

01



- b. **安装两台顶置空调时：**两台顶置空调应分别安装在距车辆前端 $1/3$ 和 $2/3$ 的位置，并处于两端的中心点（见图 02。）。

02



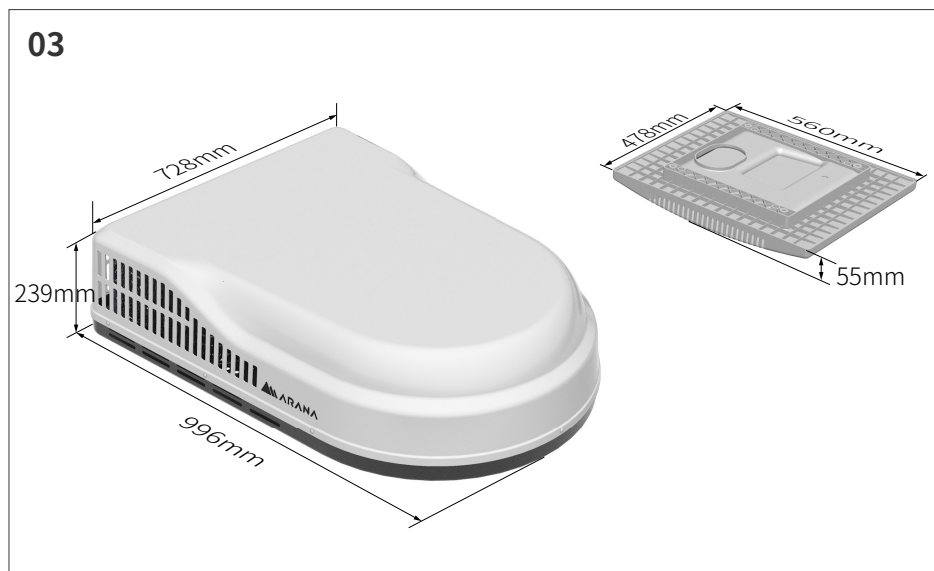
· **选择位置后：**

- 检查该电气设备安装区是否有障碍物。
- 当车辆处于运动状态时，顶部须能够支撑 60Kg 的重物，通常 100Kg 的静载荷设计可满足此要求。
- 检查车辆内部是否有阻碍安装顶置空调内面板的障碍物（如：门孔、隔间架、窗帘和天花板夹具等）。空调主机及面板的外形尺寸请见图 03。



注意！

- 该顶置空调最好水平安装（车辆停放在水平表面上为标准），最大倾斜度不可超过 5° 。
- 设计人员应负责确保车辆结构的整体性，切勿在车顶制造会积水的低洼处，否则该电气设备周围不流动的水可能会渗入车内，损坏电气设备和车辆。



5.2 顶部准备工作

- 拆除车顶通风口：
 - a. 拧开螺钉，并拆除通风口。
 - b. 去除开口处的所有填隙料。
 - c. 使用优质的耐候密封胶将车顶垫圈处的所有螺钉孔和接缝密封。

- 新开口：（非通风口的安装）

如果不打算使用现有的车顶通风口，则必须在车顶切割一个 362*362mm (± 2 mm) 或 400mm*400mm (± 2 mm) 的开口，此开口必须位于车顶加强固件之间。

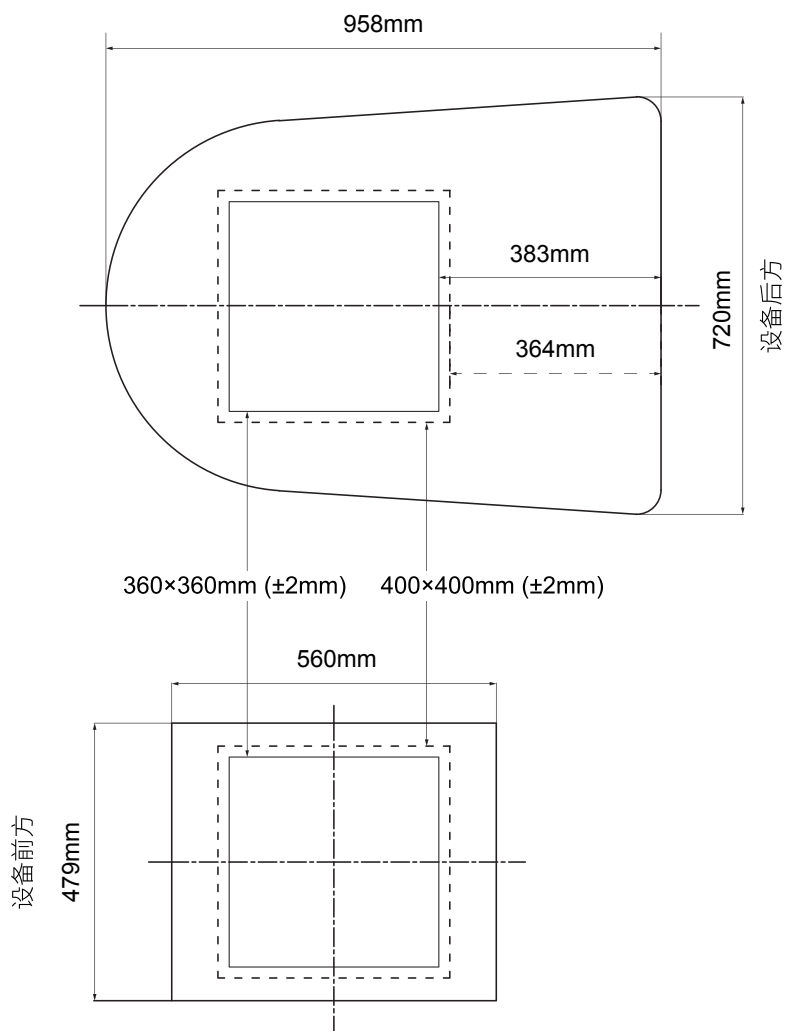
362*362mm (± 2 mm) 或 400mm*400mm (± 2 mm) 的车顶开口是安装该顶置空调所必须的，请参考图 04 所示尺寸和位置在车顶切口。



危险！

- 车顶和天花板之间可能有电线，安装时请断开 220V AC 和 12V DC 电源。不遵循此操作有触电的危险，会导致死亡或严重的人员伤害。

04



· 开口须知：

- 如果开口超过 365*365mm，则有必要安装防水垫片。
- 如果开口小于 358*358mm，则必须扩大开口。

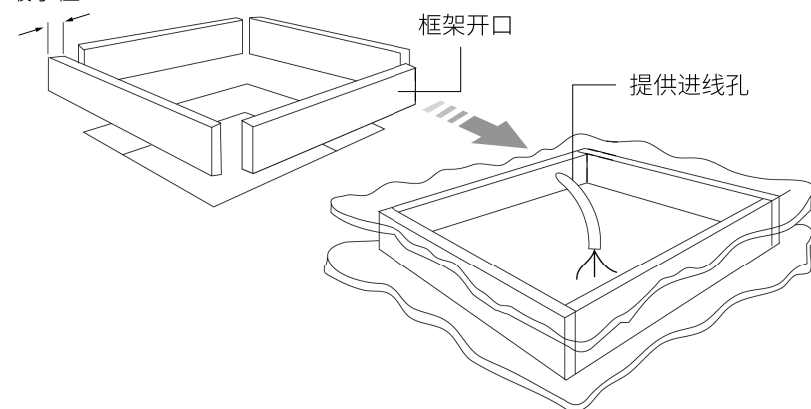
· 布线要求：

需要安装保险丝或断路器，并良好的接地。从断路器引出一条 2.5mm² 的铜质电缆线到车顶开口的前侧。

- 电源必须位于单独的 20Amp 延时断路器上。
 - 确保至少有 380mm 的电线延伸到车顶开口内部，这可方便顶置空调的安装。
 - 必须按照相关国家和地方的规定进行布线。
 - 拆除通风口之后，如果现有电线的尺寸合适并正确安装了保险丝，则可以使用。
 - 接入开口的电线需要加以保护避免损坏。
- 开口处必须有足够的支撑，并需要把车顶夹层填充保温材料，防止夹层内有空气产生共振。必须使用 20mm 厚或更厚的木条密封四周（见图 05。）。
- 362*362mm±2mm 或 400*400mm±2mm 车顶开口是回气管的组成部分，必须根据行业标准进行抛光处理。

05

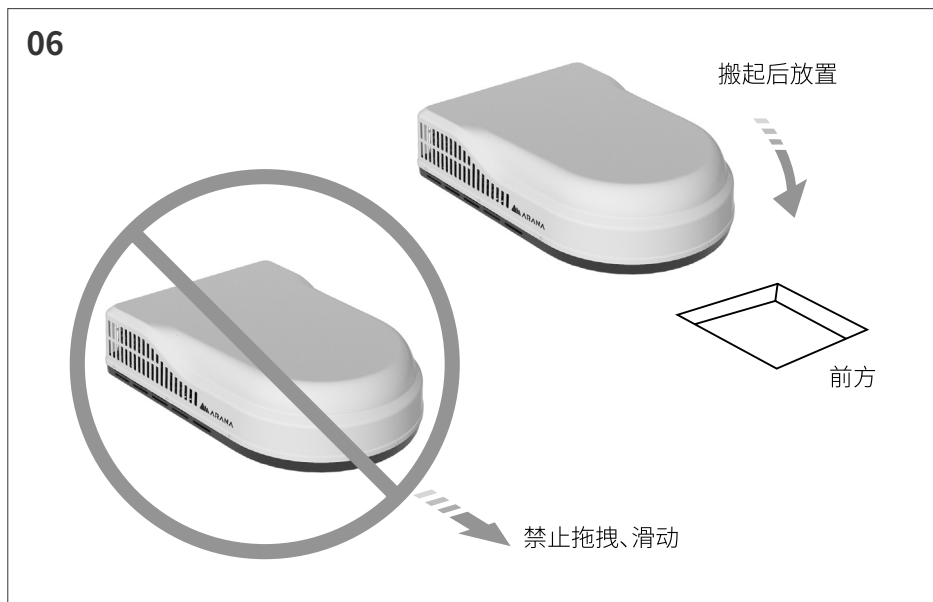
最小值20mm



5.3 将顶置空调放置在车顶上

⚠ 注意!

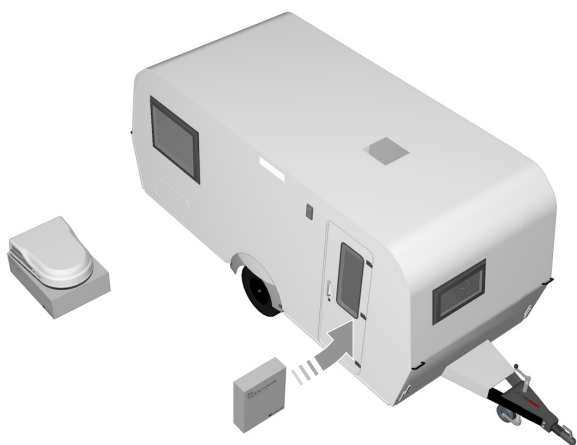
- 该顶置空调约重 37Kg。为防止损坏顶置空调，请使用机械起重机将其吊到车顶上。
- 取出纸箱内的顶置空调主机。
- 将顶置空调放在车顶上。
- 以顶置空调的 EVA 方框作为基准，搬起设备，并将其放置在准备好的开口上方。冷凝器盘管朝向房车的后方（见图 06。）。



⚠ 注意!

- 禁止拖动顶置空调，因为会损坏底部的 EVA 衬垫，导致安装后密封不严引起漏水。
- 将面板组件放入车内。该组件包含顶置空调安装用的紧固件，将被用在内部（见图 07。）。

07



- 在安装内面板时如发现外主机位置有偏差，可在内部通过安装孔微调顶置空调主机。

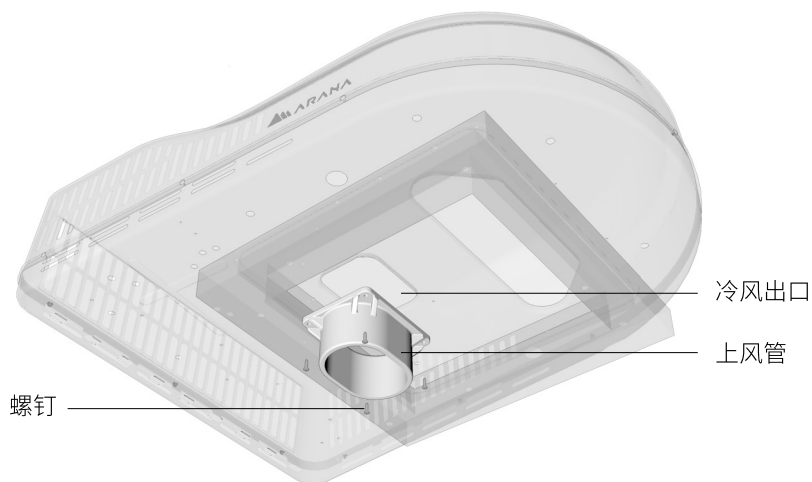
5.4 出风管和顶部安装架的安装

- 取出纸箱内的面板和安装用的紧固件。
 - a. 取出上风管，并将其固定在主机底部的冷气出口上（见图 08。）。
 - b. 用 4 颗螺钉（M4 x 8mm）将管道固定到底座的出风口处，底座底部已开有螺钉孔。
- 检查是否正确对齐，必要时调整顶置空调（车顶的 EVA 方框须刚好对齐 362*362mm 的方孔）。
- 将顶置空调的电线从回气开口内拉下来，便于随后连接（见图 09。）。

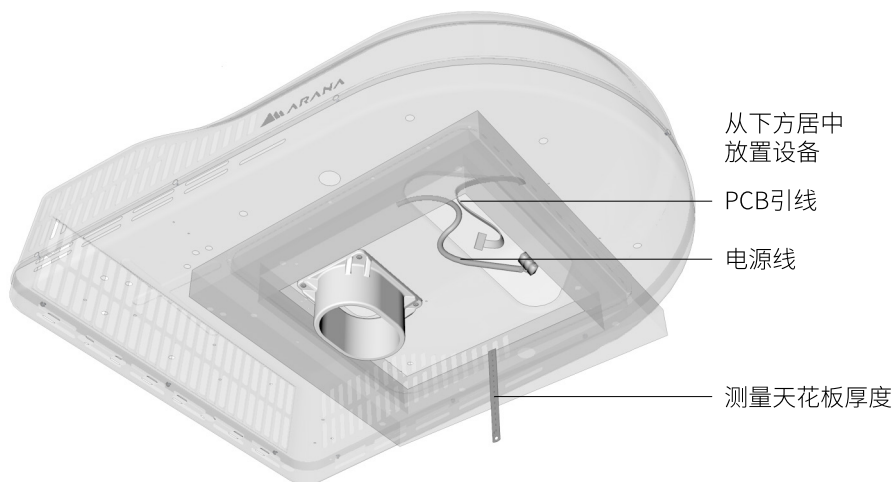
i 提示！

- 检查车顶厚度，风管由 EPP 材料制造，上、下两件接驳，最大可以适用于 140mm 车顶厚度，可以按照需要切割。

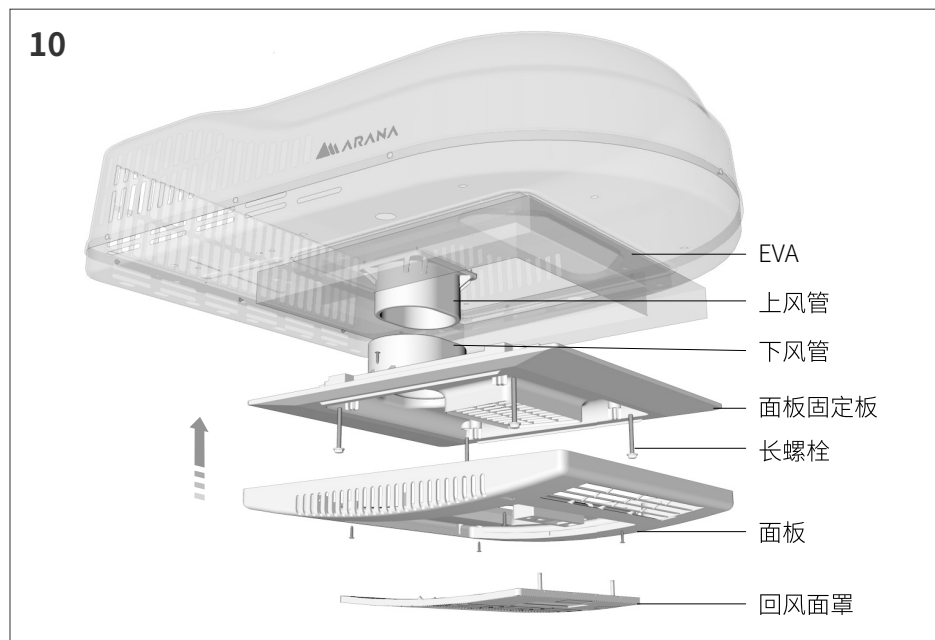
08



09



- 用 2 颗螺钉 (M5 x 12mm) 将下风管固定在安装支架风口上, 并将支架置于车顶开口。
- 将上风管插入下风管内, 并轻轻往上推, 使安装支架贴合在车顶开口。
- 用 4 根长螺栓 (M1/4 - 20 x 7.00HHW) 将支架和底盘联接起来。
- 通过紧固 4 根螺栓, 压紧 EVA 方框, 将 EVA 压缩至约 12~13mm 高为合适 (见图 10.)。
- 拆下回风面罩, 用 4 颗螺钉 (M4 x 16mm) 将面板安装到支架上。
- 再将回风面罩重新放置到面板上。



注意!

- 如果螺栓松动, 则车顶密封可能不足; 如果螺栓过度拧紧, 可能会损坏顶置空调底盘或安装支架。



提示!

- 将电控 PCB 上的引线拉出, 并与由主机拉出来的插头对接。

5.5 系统接线

危险!

- 请先断开主要电源，否则会产生电击危害，进而导致人员死亡或重伤!
- 该顶置空调有接地预留，用于防止电击危害。确保装置已连接至有可靠接地的 220V/50Hz 电路。若未能按照上述说明进行操作，则会导致人员死亡、受伤或设备受损。

重要事项：电气安装必须由电工进行，并遵守国家电气规程和当地的准则或规定。

6.0 初次使用

6.1 启动前的检查

在运行顶置空调之前，请注意以下事项：

- 检查电源是否与产品上所粘贴的铭牌参数一致。
- 请确保进气口和送风道无堵塞。所有通风格栅必须始终保持畅通，以确保顶置空调能够发挥最大的制冷性能。

注意!

- 请不要将手指或者物体插入送风道或进气格栅，小心受伤!

6.2 检查遥控器并装入电池

电池盒位于遥控器滑盖的下方。

- 轻轻向下推动滑盖，将滑盖从导向槽内滑出取下；
- 如电池盒中所示，装入两节 7 号电池（AAA）；
- 将滑盖推入导向槽，向上推动并关闭。

7.0 操作说明

7.1 基本的操作说明

顶置空调有如下三种操作模式：

操作模式	功能
关机	顶置空调处于关机状态，遥控器处于非活动状态；
待机	顶置空调已准备好运行，可以通过控制面板或者遥控器开机；
运行	顶置空调处于工作状态。

可以通过触碰控制面板上的按键实现：

- 启动顶置空调或者让其进入待机状态；
- 调节温度的高低；

可以通过遥控器的按键实现：

- 启动顶置空调或者让其进入待机状态；
- 对设置进行调整。

7.2 遥控器的使用说明

- 在操作过程中，遥控器需要指向控制面板上的红外接收器。
- 按下按钮时，设置的数值将直接传输给顶置空调。顶置空调通过发出蜂鸣声确认收到了数据。

自动运行

- 1 按电源开关键“”，将空调器切换为开启状态，空调器记忆上次关机前运行模式运行；
- 2 按运行模式键“”，将空调器切换到自动运行模式，空调器以自动运行模式运行；
- 3 通过判断室内环境温度自动选择运行模式（制冷、制热、送风）。初次温度设定值为 25℃，通过温度设定键“+”或“-”可以实现对温度设定值递增或递减 1-2 度。
- 4 按风速选择键“”，调节风速，有高 / 中 / 低 / 自动四个风速可选。选择自动风“**AUTO**”时，通过环境温度与设定温度自动调节风速；
- 5 按电源开关键“”，将空调器切换为关闭状态，空调器停止工作，下次按电源开关键“”，空调器将以本次记忆模式运行。

制冷运行

- 1 按电源开关键“”，将空调器切换为开启状态，空调器记忆上次关机前运行模式运行；
- 2 按运行模式键“”，将空调器切换到制冷“”运行模式，空调器以制冷运行模式运行；
- 3 按温度设定键“+”或“-”，设定所需温度；
- 4 按风速选择键“”，调节风速，有高 / 中 / 低 / 自动四个风速可选。选择自动风“**AUTO**”时，通过环境温度与设定温度自动调节风速；
- 5 按电源开关键“”，将空调器切换为关闭状态，空调器停止工作，下次按电源开关键“”，空调器将以本次记忆模式运行。

制热运行

- 1 按电源开关“”，将空调器切换为开启状态，空调器记忆上次关机前运行模式运行；
- 2 按运行模式键“”，将空调器切换到制热“”运行模式，空调器以制热运行模式运行；
- 3 按温度设定键“+”或“-”，设定所需温度；
- 4 按风速选择键“”，调节风速，有高/中/低/自动四个风速可选。选择自动风“AUTO”时，通过环境温度与设定温度自动调节风速；
- 5 按电源开关“”，将空调器切换为关闭状态，空调器停止工作，下次按电源开关“”，空调器将以本次记忆模式运行。

送风运行

- 1 按电源开关“”，将空调器切换为开启状态，空调器记忆上次关机前运行模式运行；
- 2 按运行模式键“”，将空调器切换到送风“”运行模式，空调器以送风运行模式运行；
- 3 按温度设定键“+”或“-”，设定无效；
- 4 按风速选择键“”，调节风速，有高/中/低/自动四个风速可选。选择自动风“AUTO”时，通过环境温度与设定温度自动调节风速；
- 5 按电源开关“”，将空调器切换为关闭状态，空调器停止工作，下次按电源开关“”，空调器将以本次记忆模式运行。

8.0 清洁与维护

警告！

- 该处所述的任何维护工作只能由专业人员完成，因为他们了解处理制冷剂和顶置空调以及相关事项时可能出现的风险。

注意！预防伤害

- 不要使用高压水枪清理顶置空调。用水冲洗会造成顶置空调损坏。
- 不要使用锋利或者坚硬的东西或者清洁剂清理，否则会造成顶置空调损坏。
- 清理顶置空调时，在清水中加入柔和的清洁剂，切勿使用汽油、柴油或者溶剂。

清洁顶置空调

- 用湿布清理顶置空调的外壳和通风口单元。
- 定期清除顶置空调通风网栅上的落叶和其它污物，清理过程中请注意不要损坏网栅。
- 定期取下回风面罩后面的空气过滤网，用温水清洗，风干后重新装好。
- 用微湿布擦拭遥控器，我们建议使用眼镜清洁布来清洁显示屏。

维护顶置空调

- 定期检查冷凝水的排放通道是否通畅，冷凝水是否能够排出。
- 每年检查一次顶置空调与车顶的密封处是否有裂痕和其它损坏。

9.0 故障排除

如果顶置空调不能正常运行，请做以下检查排除故障：

- 检查顶置空调的保险丝或车辆漏电开关是否打开。
- 如果使用发电机供电启动顶置空调，请先确认发电机输出功率与顶置空调是否匹配，发电机是否正常运行并发电，以及电压输出是否稳定。

- 如果与市电相连，请确认电源线规格是否与顶置空调的运行载荷相匹配，再检查市电电压是否达标（顶置空调运行电压 220V）。
- 完成上述检查后顶置空调依然无法正常运行，请联系供应商寻求进一步的帮助。该电气设备须由专业人员进行维修。

故障代码	故障	解决办法
E1	室内温度传感器故障	请检查连接是否松动；如果不是，请更换传感器。 请检查四个出风口是否打开（至少应打开两个）。
E2	室内盘管温度传感器故障	请检查与电路板的连接是否松动；或检查传感器上的铜探头是否掉出；如果不是，请更换传感器。
E3	制冷系统不良（制冷剂不足、风量不足或室外出风口堵塞）	1、请检查压缩机是否运行（线路连接良好的情况下）。 2、检查通风面板安装是否正确，保证通风正常。 3、如有气体泄漏，请及时维修。
E4	制热系统不良（制冷剂不足）	1、请检查压缩机是否运行（线路连接良好的情况下）。 2、检查通风面板安装是否正确，保证通风正常。 3、如有气体泄漏，请及时维修。
E5	制冷低温保护	1、请检查过滤网是否干净。如有需要，请清洗。 2、请检查空调是否在低于 18 度的室外温度下运行；建议开窗透气，不用开启制冷模式。 3、请检查是否至少有两个出风口已打开。 4、请检查室内风机的转速是否正常；若有异常，请检查电机。
E6	热泵高温保护	1、请检查过滤网是否干净。如有需要，请清洗。 2、请检查空调是否在高于 20 度的室外温度下运行；建议开窗，不用开启制热模式。 3、请检查是否至少有两个出风口已打开。 4、请检查室内风机的转速是否正常；若有异常，请检查电机。

10.0 技术参数

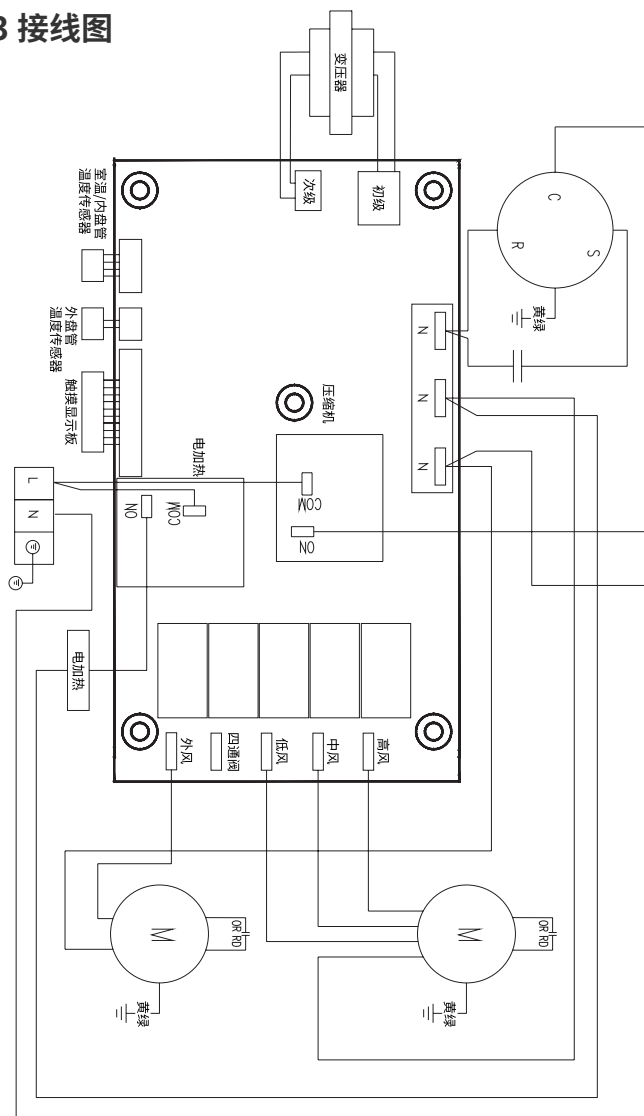
顶置空调型号	KAC 33	KAC 25
顶置空调类型	单冷电热型	热泵型
控制类型	无线遥控	
额定制冷量	3180W	2500W
额定制冷功率	1460W	1060W
额定制热量	2000W	2500W
额定制热功率 (电加热)	2070W	990W
电源	220V-240V 50Hz	
运行电流 (制冷)	6.8A	4.8A
运行电流 (制热)	9.1A	4.5A
启动电源 (压缩机)	19A	16A
制冷剂	R410a	
制冷剂数量	800g	650g
风量 (高速)	480m ³ /h	480m ³ /h
电缆线标准	国际 4mm ² 铜线, 长度不得超过 8m	国际 2.5mm ² 铜线, 长度不得超过 8m
电路保护	20Amp 保险丝或熔断器, 供电线不与其他电器公用	
发电机要求	1 台顶置空调, 配 3.5KW 发电机	1 台顶置空调, 配 2.5KW 发电机
尺寸 L x W x H	996 x 728 x 252mm (安装后高出车顶的高度)	
重量	42Kg	36Kg

提示!

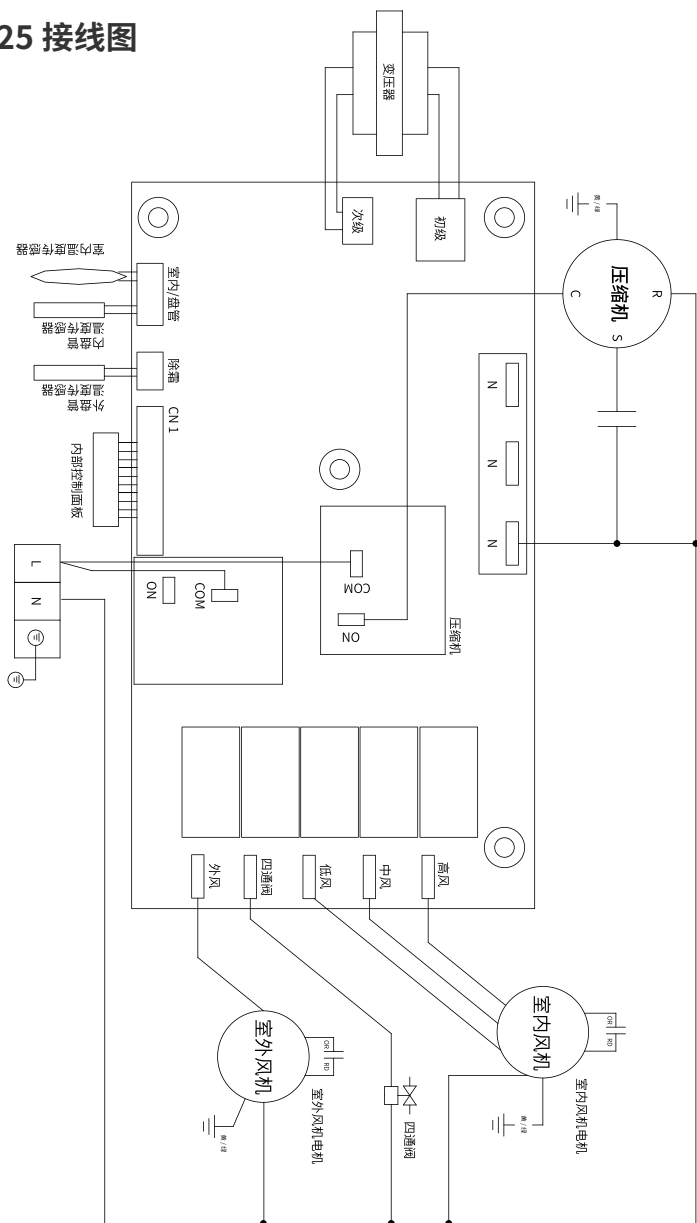
- 我们将不断改进我们的产品, 并保留修改某些规格的权利, 恕不另行通知, 请以产品铭牌为主。

11.0 电路接线图

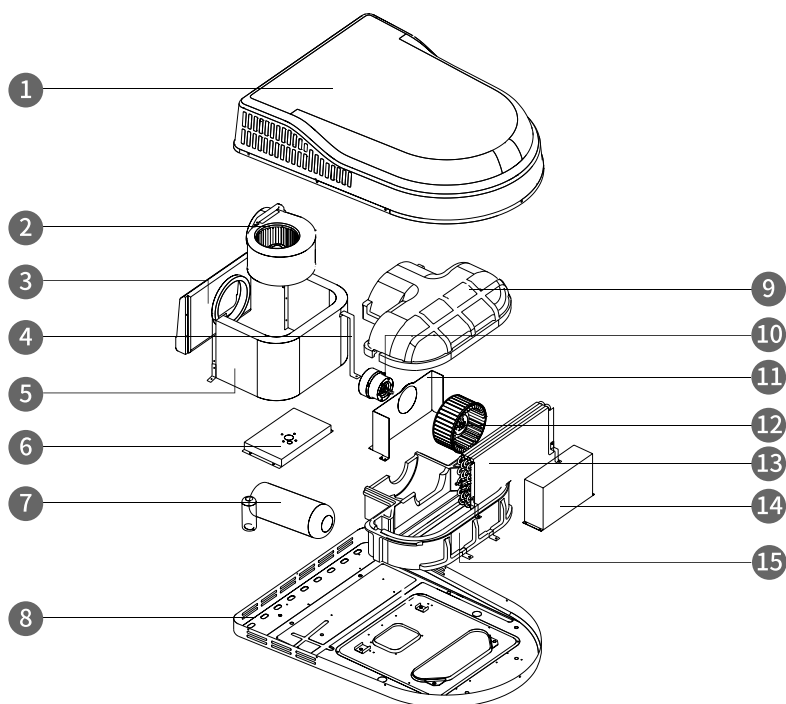
KAC 33 接线图



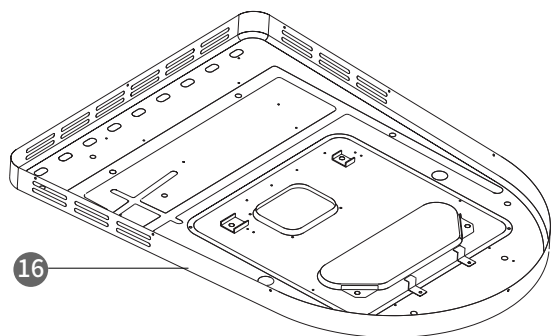
26



12.0 零部件明细表

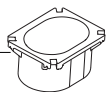


1	外壳	9	上泡沫
2	外风机组件	10	内风机
3	外风机	11	内风机安装板
4	冷凝器固定板	12	风轮
5	冷凝器	13	蒸发器
6	外风机安装板	14	电控盒
7	压缩机	15	下泡沫
8	底板		



16

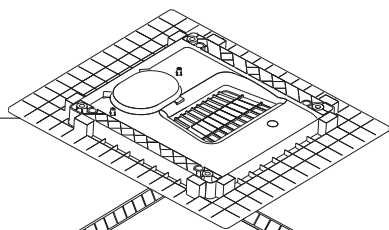
17



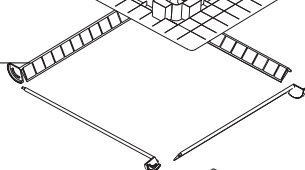
18



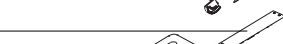
19



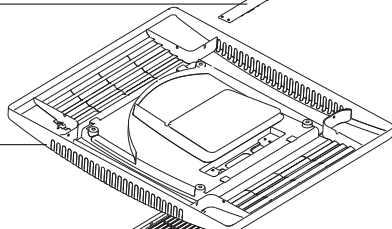
20



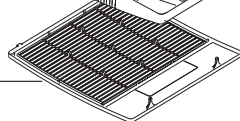
21



22



23



16	底板
17	上风管
18	下风管
19	面板固定板
20	百叶
21	显示板
22	面板
23	回风面罩

13.0 质量保证

该顶置空调适用法律规定的保修条款和条件，如果产品出现故障，请与最近的经销商联系。

维修该顶置空调，请准备好如下文件：

- 注明购买日期的发票复印件。
- 故障的描述或索赔原因。

但是产品的保修将不覆盖如下情况：

- 在消费者使用产品时所发生的损坏、事故等，而这些损坏不是由于产品材料的缺陷或制造原因导致的。
- 消费者未按照说明书规定进行的误操作而导致的损坏。
- 整机外观破损，包括磨损导致的外观损坏。
- 未经制造商授权的维修、更改。



保 修 卡

客户姓名		联系电话	
产品名称		产品型号	
购买日期		序 列 号	
如果该设备为车厂原装空调，请您填写如下车辆信息：			
车辆品牌		车辆型号	
购买日期		车 架 号	
<p>本保修卡请用户妥善保管，以做维修凭证。</p> <p>保修期限自购买之日起十二个月内。</p> <p>全国统一服务电话：400 110 1890</p>		 <p>请关注微信公众号</p>	



阿雷纳科技(深圳)有限公司
ARANA Technology (Shenzhen) Co., Ltd.

Thanks for choosing **ARANA** air conditioning devices. Please read the instructions carefully before installation or first use of the device and store it in a place where all users could find it for easy reference. If the device is transferred or sold, please hand over the instructions along with it so that the new user is aware of installation methods, usage and safety requirements.

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1.0 Explanation of symbols



DANGER!

Indicates a potential hazardous situation which, if not avoided, could result in death or serious injury.



WARNING!

Indicates a potential hazardous situation which, if not avoided, could result in minor or moderate injury.



ATTENTION!

Indicates a potential hazardous situation which, if not avoided, could result in property damage.



NOTE!

Supplementary information for product operation.

2.0 Safety instructions

Please observe the prescribed safety instructions and stipulations from the vehicle manufacturer and service workshops.

ARANA accepts no liability for damage in the following cases:

- Faulty assembly or connection
- Damage to the product resulting from mechanical influences and excess voltage
- Alterations to the product without express permission from the manufacturer
- Use for purposes other than those described in the operating manual

2.1 General safety instructions



WARNING!

- Installation and repair of the roof air conditioner may only be carried out by qualified personnel who are familiar with the risks involved and the relevant regulations. Inadequate repairs may cause serious hazards.
- Electrical devices are not toys.
- Keep electrical devices out of reach of children or infirm persons. Do not allow them to use electrical devices without supervision.

- Persons whose physical, sensory or mental capabilities or whose lack of experience and knowledge prevent them from using electrical devices safely should not use it without supervision or instruction by a responsible person.
- Do not undo the upper cover of the roof air conditioner in the event of a fire. Use approved extinguishing agents instead. Do not use water to extinguish fires.



ATTENTION!

- The roof air conditioner must be installed securely so that it cannot fall down.
- Do not use the roof air conditioner near flammable fluids or in closed rooms.
- Make sure no combustible objects are stored or installed near the air outlet. A distance of at least 50 cm must be kept.
- Do not reach into air outlets or insert any foreign objects in the roof air conditioner.



ATTENTION!

- Only use the device as intended.
- The roof air conditioner is not suitable for use in agricultural or construction vehicles.
- Do not make any alterations or conversions to the electrical device.
- If faults occur in the refrigerant circuit, the system must be checked by a specialist company and repaired properly. The refrigerant must never be released into the air.



NOTE!

- Please ask your vehicle manufacturer if a technical inspection is required after fitting an roof air conditioner and whether the height entered in the vehicle documents needs to be altered.

2.2 Operating the device safely



WARNING!

- The electrical power supply may only be connected by a qualified electrician.
- Always disconnect the power supply when working on the electrical device.



ATTENTION!

- Use cable ducts to lay cables through walls with sharp edges.
- Do not lay loose or bent cables next to electrically conductive materials (metal).
- Operate the electrical device only if you are certain that the housing and the cables are undamaged.

3.0 Intended use

The roof air conditioner is designed for use in motorcaravans, caravans and other vehicles with habitation compartments only.

The roof air conditioner is not suitable for installation in construction machines, agricultural machines or similar equipment. It will not work properly if exposed to strong vibrations.

Please do not use the roof air conditioner if the ambient temperature is over 52° C. The performance will be affected at extreme temperature.



NOTE!

- You can find additional information on roof air conditioners in the operating manual, such as the technical description or the controls.

4.0 Technical description

The roof air conditioner supplies the interior with cool or warm dehumidified air without dust and dirt.

The roof air conditioner is operated with the button on control panel and the remote control.

NOTE!

- The roof air conditioner can lower the temperature within the vehicle to a certain level. The temperature depends on the type of vehicle, the ambient temperature and the cooling capacity of your roof air conditioner.
- Below an outer temperature of 16° C the roof air conditioner does not cool anymore. In this case only use the "Ventillation" mode.

4.1 Components

The refrigerant circuit of the roof air conditioner consists of the following main components (see Parts list in page 53).

• **Compressor**

The compressor draws in the refrigerant used and compresses it. This raises the pressure and therefore the temperature of the refrigerant.

• **Condenser**

The built-in liquefier works like a cooler or heat exchanger. The air flowing past absorbs the heat and the hot refrigerant gas cools down and becomes liquid.

• **Evaporator**

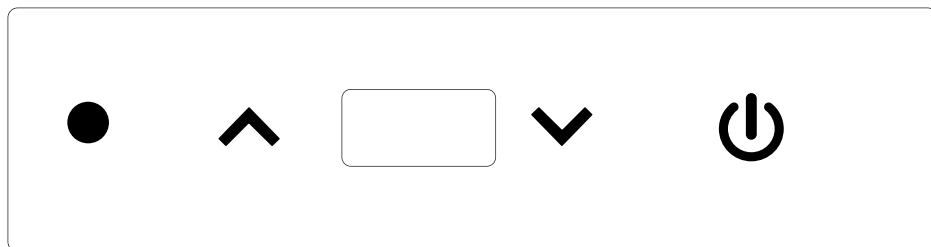
The evaporators cool down and dehumidify the air flowing past them. The refrigerant absorbs the heat and vaporizes.

• **Blower**

The blower distributes the cooled air within the vehicle through an air outlet unit.

4.2 Control panel

The control panel is at the air outlet unit of the roof air conditioner.
It contains the following control and display elements:



Explanation

Button 

Switches the roof air conditioner on, off or to stand-by mode

Button 

Increases the temperature value

Button 

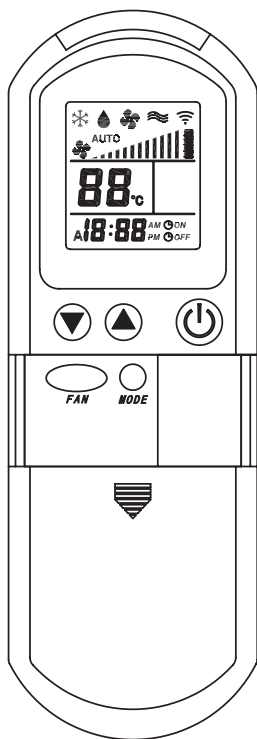
Reduces the temperature value

4.3 Remote control

All settings of the device are transmitted to the roof air conditioner by remote control.
The following control and display elements are available on the remote control:

Explanation

EN



Digital display

Timer **18:88** AM PM

Set temperature (target value) in °C **88**°C

Mode ❄️ 💧 🌀 🌊 📶

Fan level 🌀 AUTO 📶

(*Some functions are not available for this model.)

Button 

Switches the roof air conditioner and remote control on or to stand-by mode

Button 

Selects the mode

Button 

Increases the value

Button 






Reduces the value

Button 

Selects the fan setting

4.4 Air conditioning modes

The roof air conditioner has the following air conditioning modes:

Mode	Display message	Explanation
Automatic	 	The roof air conditioner automatically maintains the temperature between 20 °C and 25 °C by heating or cooling as needed.
Cooling		You specify the temperature and blower settings, and the roof air conditioner cools the interior to this temperature.
Heating		You specify the temperature and blower settings, and the roof air conditioner heats the interior to this temperature.
Ventillation		You specify the fan level, and the roof air conditioner blows air into the interior.

NOTE!

- Please use the connecting wirings which are in accordance with state regulations.
- When selecting the generator capacity, it is important to consider the total power consumption of the vehicle, and the power loss of the generator due to high altitude and lack of maintenance.
- Circuit protection: Make sure to use the leakage protector.

5.0 Installation instructions

ATTENTION!

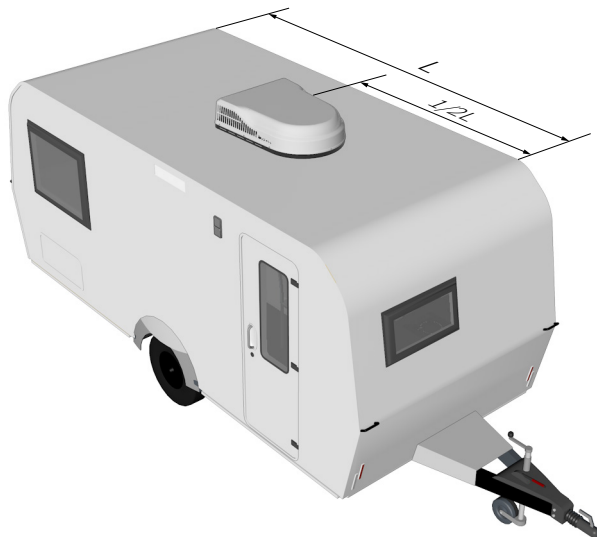
- Read installation and operating instructions carefully before attempting to start your roof air conditioner installation.
- The manufacturer will not be liable for any damages or injury incurred due to non-compliance of the instructions.
- Installation must comply with the national and local codes and/or regulations.
- DO NOT add any devices or accessories to the roof air conditioner except those specifically authorized in writing by **ARANA**.
- This equipment must be serviced by qualified personnel and some states require these people to be licensed.

5.1 Choosing Installation location

This roof air conditioner is specifically designed for installation on the roof of a vehicle with habitation compartments. The following points need to be considered to determine the cooling requirements:

- The size of the vehicle.
- The size of the window (increases heat gain).
- Amount of insulation in walls and roof.
- Geographical location where the vehicle will be used.
- **Normal locations:** the roof air conditioner is designed to fit over an existing roof vent opening. When the vent is removed, it normally creates a 362*362mm (+/-2mm) opening or a 400*400mm (+/-2mm) opening.
- **Other locations:** When no roof vent is available or another location is desired, the following is recommended:
 - a. **For one unit installation:** The roof air conditioner should be mounted slightly forward of center (front to back) and centered from side to side. See FIG.01.

01



- b. **For two units installation:** Install one roof air conditioner $\frac{1}{3}$ and the other $\frac{2}{3}$ from front of vehicle and centered from side to side. See FIG.02.

02



• **After location has been selected:**

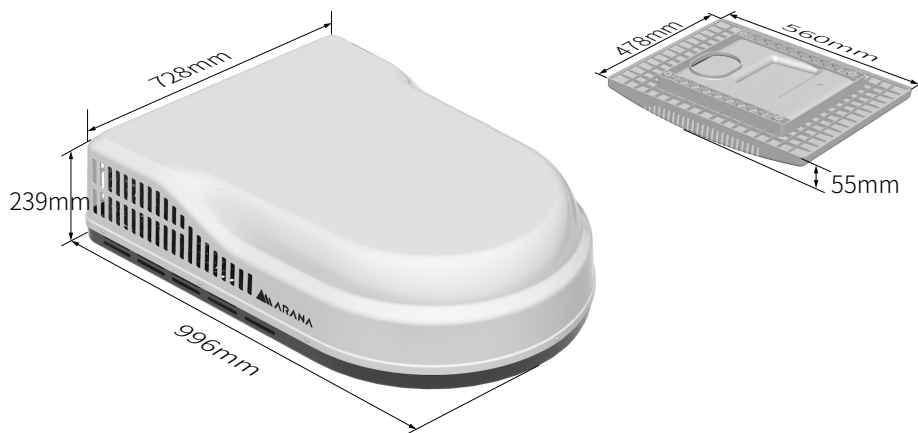
- Check for obstructions in the area where roof air conditioner will be installed.
- The roof must be designed to support 60KG when the vehicle is in motion.
Normally a 100KG static load design will meet this requirement.
- Check inside the vehicle for air distribution box obstructions(i.e. door openings, room dividers, curtains, ceiling fixtures, etc.). Please check the dimensions of the roof air conditioner and the air distribution box. See FIG.03.



ATTENTION!

- It is preferred that the unit be installed on a relatively flat and level roof section measured with the vehicle parked on a level surface, but up to a 5° tilt is acceptable.
- It is the responsibility of the designer to ensure the structural integrity of the vehicle. Never create a low spot on the roof where water will collect. Water standing around the roof air conditioner may leak into the interior causing damage to the product and vehicle.

03



5.2 Roof preparation

- **Roof vent removal:**

- Unscrew and remove the roof vent.
- Remove all caulking compound around opening.
- Seal all screw holes and seams where the roof gasket will be located. Use a good grade of all weather sealer.

- **New opening :** (installation other than vent opening)

A 362*362mm (+/-2mm) or 400*400mm (+/-2mm) opening must be cut through the roof and ceiling of the vehicle if the existing vents will not be used. It is recommended this opening be located between roof reinforcing members.

Mark a 362*362mm (+/-2mm) or 400*400mm (+/-2mm) square on the roof and carefully cut the opening. Using the roof opening as a guide, cut the matching hole in the ceiling. See FIG.04.



DANGER!

- There may be electrical wiring between the roof and the ceiling. Disconnect 220V AC power cord and the positive (+) 12V DC terminal at the supply battery. Failure to follow this instruction may create a shock hazard causing death or severe personal injury.
- **Opening instructions:**
 - If the opening exceeds 365*365mm, it will be necessary to install spacers.
 - If the opening is less than 358*358mm, it must be enlarged.
- **Wiring requirements:**

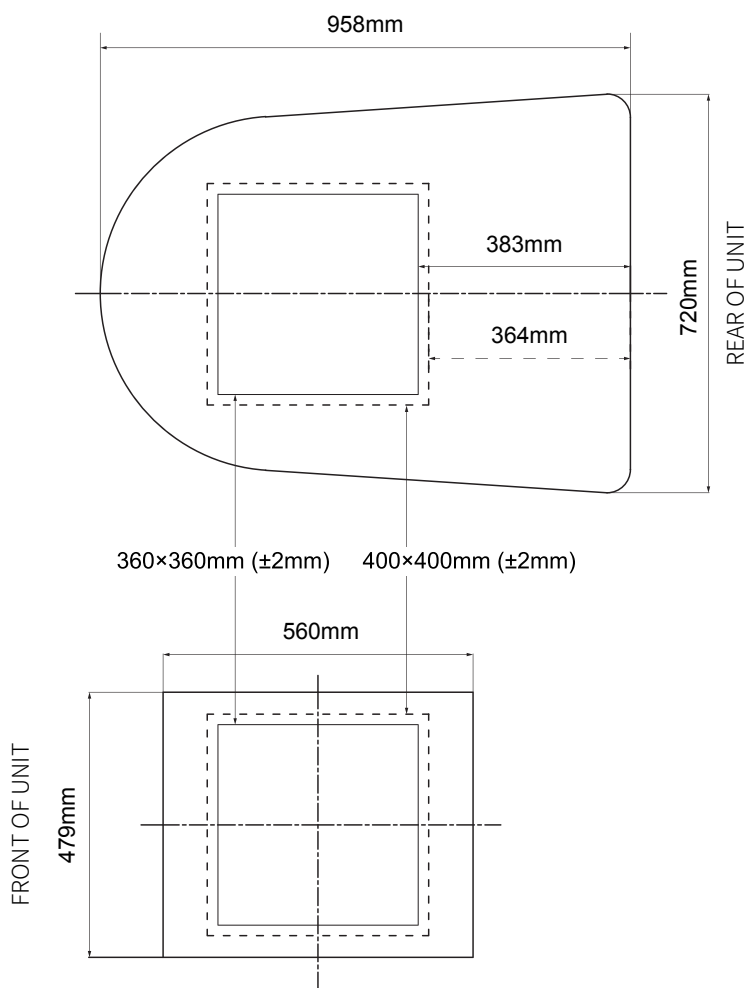
Route a copper 2.5mm², with ground, supply line from the fuse or circuit breaker box to the roof opening.

 - The power supply must be on a separate 20 Amp Time Delay Fuse or HACR Circuit Breaker.
 - Make sure at least 380mm of wire extends into the roof opening. This insures easy

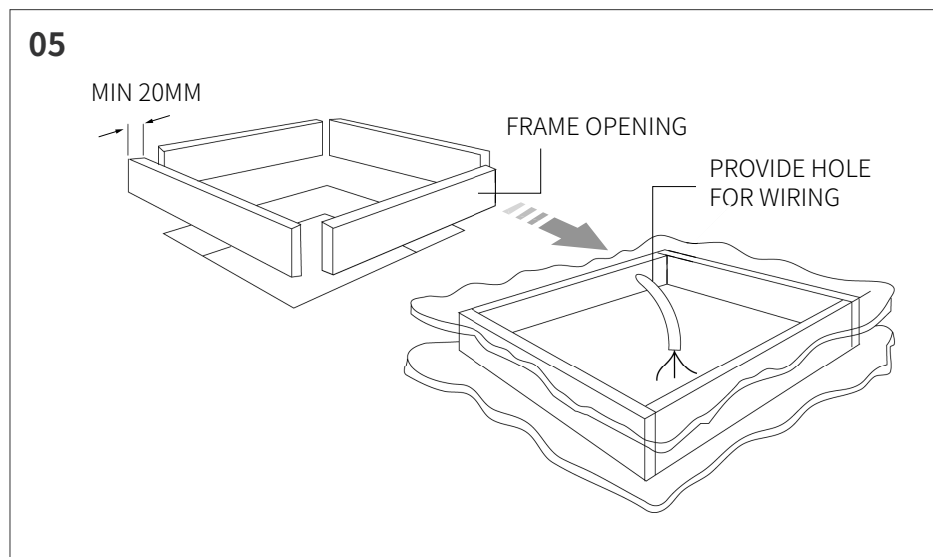
roof air conditioner attachment.

- c. Wiring methods must comply with all national and local wiring codes and/or regulations.
- d. If vent fan was removed, the existing wire may be used provided it is of proper size and correctly fused.
- e. The entry wires to the opening need more protection to avoid damage.

04



- The opening must be framed to provide adequate support and prevent air from being drawn from the roof cavity. Framing stock 20mm or more in thickness must be used. Remember to provide an entrance hole for the power supply wire. See FIG.05.



- The 362*362mm (+/-2mm) or 400*400mm (+/-2mm) roof opening is part of the return air duct and must be polished according to the industry standard.

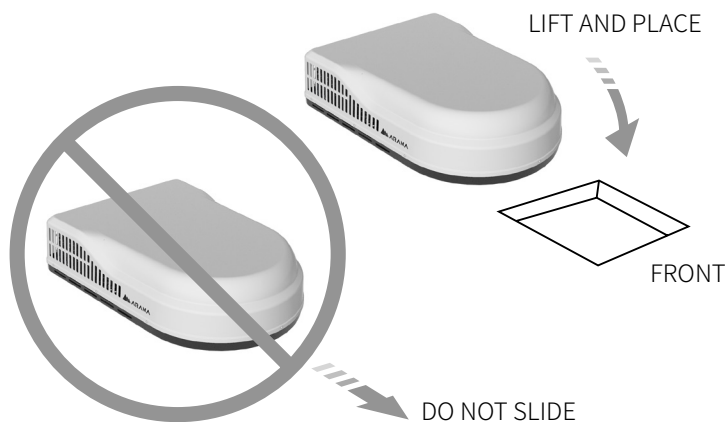
5.3 Placing roof air conditioner on the roof



ATTENTION!

- This roof air conditioner weighs approximately 37Kg. To prevent back injury, use a mechanical hoist to place air conditioner on roof.
- Take out the roof air conditioner from the carton.
- Place the roof air conditioner on the vehicle roof.
- Lift and place roof air conditioner over the prepared opening using the EVA gasket as a guide. The condenser coil goes toward the rear of the vehicle. See FIG.06.

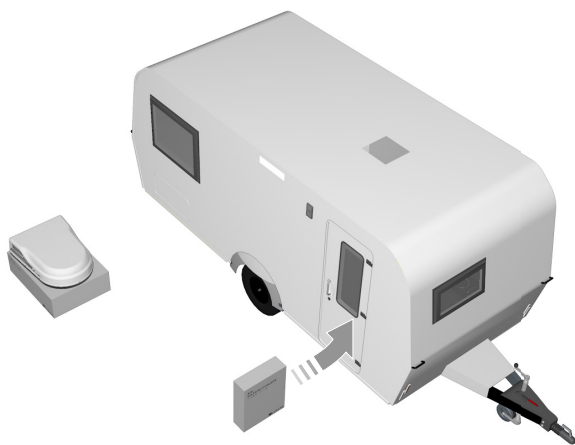
06



ATTENTION!

- Do not slide the unit. This may damage the EVA gasket attached to the bottom and create a leaky installation.
- Place the air distribution box kit inside the vehicle. This unit contains mounting hardware for the roof air conditioner and will be used inside the vehicle. See FIG.07.

07



This completes the outside work. Minor adjustments can be done from the inside of the vehicle if required.

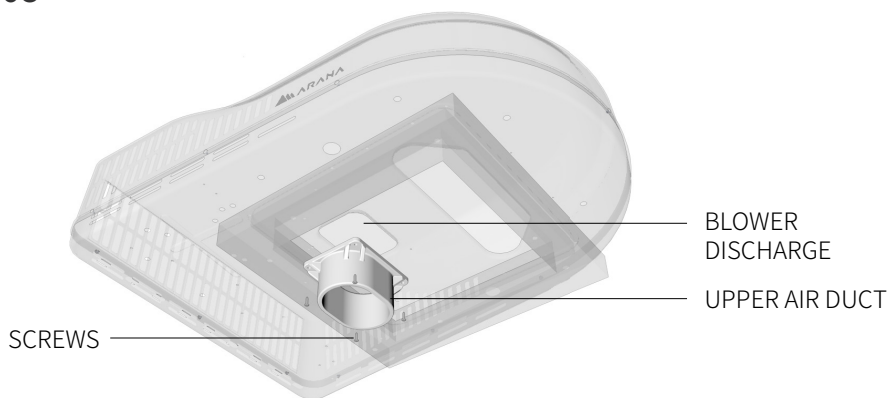
5.4 Installing discharge duct and mounting bracket

- Taking out air distribution box and mounting hardware from carton.
 - a. Taking out the upper air duct and locate it over blower discharge. See FIG.08.
 - b. Use 4 screws (M4 x 8mm) to hold duct to base pan. Holes are provided at bottom of base pan for these screws to go into.
- Check for correct alignment and adjust the roof air conditioner as necessary (EVA gasket centers over 362*362mm square opening).
- Reach up into return air opening and pull the unit electrical cord down for later connection. See FIG.09.

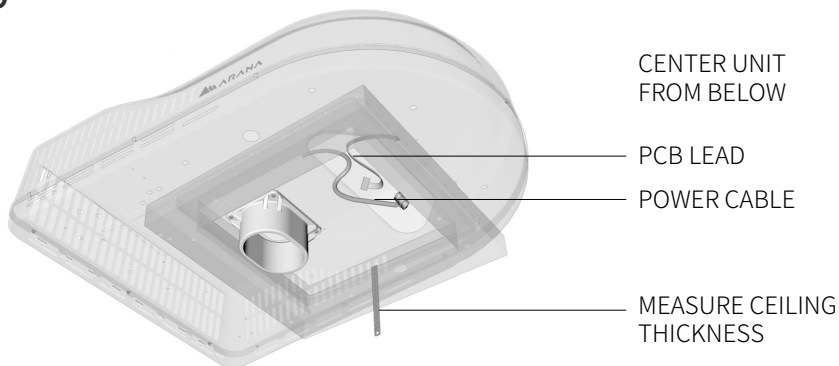
NOTE!

- Check the thickness of the vehicle roof, the air conduct is made of EPP material, connecting the upper and lower parts which is suitable for maximum 140mm roof thickness. You can cut it as needed.

08



09



- Fix the lower air duct to the outlet of the mounting bracket with 2 screws (M5x 12mm) and place the bracket on the roof opening.
- Insert the upper air duct into the lower air duct directly and gently push it up to make the mounting bracket close to the roof opening.
- Connect the bracket and base pan with 4 long bolts (M1/4 - 20 x 7.00HHW).
- Tighten the EVA gasket by fastening the 4 bolts. It is appropriate to compress EVA gasket to a height of about 12~13mm. See FIG.10.
- Remove the return air grille and install the panel to the mounting bracket with 4 screws (M4 x 16mm) .
- Replace the return air grille to the panel.



ATTENTION!

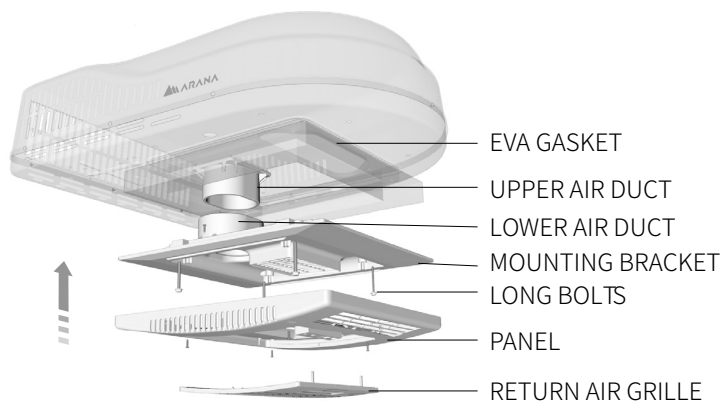
- If bolts are left loose there may not be an adequate roof seal or if over tightened, damage may occur to the roof air conditioner base or mounting bracket. Tighten to torque specifications listed in this manual.



ATTENTION!

- Pull out the lead wiring on the electric control PCB, and connect with the plug which is pulled out from the main unit.

10



5.5 Wiring the system



DANGER!

- Disconnect 220V AC. Failure to follow these instructions could create a shock hazard causing death or severe personal injury!
- This product is equipped with a 3 wires (grounded) system for protection against shock hazard. Make sure that the appliance is wired into a properly grounded 220V/50Hz AC circuit and the polarity is correct. Failure to do so could result in death, personal injury or damage to the equipment.

Note: All wiring must be done by qualified personnel and comply with the national and local wiring codes and/or regulations.

6.0 Initial use

6.1 Inspection before starting up

Before you switch on the roof air conditioner, observe the following:

- Check whether the supply voltage corresponds to the values specified in the data plate .

- Ensure both the air intake opening and the air nozzles are free. All ventilation grilles must always be kept free to ensure that the roof air conditioner is able to operate at maximum capacity.



ATTENTION!

- Do not insert your fingers or objects into the air nozzles or the intake grille. Beware of injury!

6.2 Checking remote control and insert batteries

The battery compartment is located below the sliding lid of the remote control.

- Gently push down the sliding lid out of the guide slot and remove it.
- Insert the new batteries (2 x type AAA) in the remote control as indicated in the battery compartment.
- Push the sliding lid into the guide slot, and push up to close it.

7.0 Operating the roof air conditioner

7.1 Basic notes on operation

The roof air conditioner has three operating modes:

Operating mode	Features
Off	The roof air conditioner is switched off. The remote control is inactive.
Stand-by	The roof air conditioner is ready for operation and can be switched on with control panel or remote control.
On	The roof air conditioner is in working mode.

You can touch the control panel to






- switch the roof air conditioner on or to stand-by mode.
- adjust the temperature up or down.

You can use the remote control to







- switch the roof air conditioner on or stand-by mode.
- make adjustments to the settings.

7.2 Operating instructions of remote control







- The remote control must be pointed to the IR receiver on the control panel during operation.
- When a button is pressed, the value is transmitted directly to the roof air condoner. The roof air conditioner confirms the receipt of data by a beep.

Automatic Operation	
1	Pressing power button "  ", switching the roof air conditioner on, it remembers the operating mode before powering off last time.
2	Pressing operating mode key "  ", switching the roof air conditioner to automatic operating mode, it operates in automatic mode.
3	Choosing the operating mode automatically by judging the indoor ambient temperature (Cooling, Heating, Air supplying). The initial temperature value is set as 25°C, the setting value can be increased or decreased by 1-2°C through the temperature setting key "+" or "-".
4	Pressing the wind speed selection key "  " to adjust wind speed, including four options: High, Mid, Low and Auto. When selecting "AUTO", the wind speed is adjusted automatically by ambient temperature and setting temperature.
5	Pressing power button "  ", switching the roof air conditioner off, it stops working. Pressing power button "  " next time, the air conditioner will operate in memorial mode of this time.







Cooling Operation

- 1 Pressing power button "  ", switching the roof air conditioner on, it remembers the operating mode before powering off last time.
- 2 Pressing operating mode key "  ", switching the roof air conditioner to cooling "  " operating mode, it operates in cooling mode.
- 3 Pressing temperature setting key "+" or "-" to set the required temperature.
- 4 Pressing the wind speed selection key "  " to adjust wind speed, including four options: High, Mid, Low and Auto. When selecting " **AUTO** ", the wind speed is adjusted automatically by ambient temperature and setting temperature.
- 5 Pressing power button "  ", switching the roof air conditioner off, it stops working. Pressing power button "  " next time, the air conditioner will operate in memorial mode of this time.

Heating Operation

- 1 Pressing power button "  ", switching the roof air conditioner on, it remembers the operating mode before powering off last time.
- 2 Pressing operating mode key "  ", switching the roof air conditioner to heating "  " operating mode, it operates in heating mode.
- 3 Pressing temperature setting key "+" or "-" to set the required temperature.
- 4 Pressing the wind speed selection key "  " to adjust wind speed, including four options: High, Mid, Low and Auto. When selecting " **AUTO** ", the wind speed is adjusted automatically by ambient temperature and setting temperature.
- 5 Pressing power button "  ", switching the roof air conditioner off, it stops working. Pressing power button "  " next time, the air conditioner will operate in memorial mode of this time.

Ventilation Operation

- 1 Pressing power button "  ", switching the roof air conditioner on, it remembers the operating mode before powering off last time.
- 2 Pressing operating mode key "  ", switching the roof air conditioner to air supplying "  " operating mode, it operates in ventilation mode.
- 3 Pressing temperature setting key "+" or "-" is invalid in ventilation mode.
- 4 Pressing the wind speed selection key "  " to adjust wind speed, including four options: High, Mid, Low and Auto. When selecting " **AUTO** ", the wind speed is adjusted automatically by ambient temperature and setting temperature.
- 5 Pressing power button "  ", switching the roof air conditioner off, it stops working. Pressing power button "  " next time, the air conditioner will operate in memorial mode of this time.

8.0 Cleaning and maintenance



WARNING!

- Any other maintenance work to that which is described here may only be carried out by qualified personnel who are familiar with the risks involved when handling refrigerant and air conditioning systems as well as the relevant regulations.



ATTENTION! Beware of damage

- Do not clean the roof air conditioner with a high-pressure cleaner. Exposure to water can damage the roof air conditioner.
- Do not use sharp or hard objects or cleaning agents for cleaning as these may damage the roof air conditioner.
- To clean the roof air conditioner, use water with a gentle cleaning agent. Never use petrol, diesel or solvents.

Cleaning the roof air conditioner

- Clean the housing of the roof air conditioner and the air outlet unit occasionally with a damp cloth.
- Regularly remove leaves and other dirt from the ventilation grilles of the roof air conditioner. Make sure you do not damage the grilles in the process.
- Regularly clean the filter of the air return grille with warm water, and reinstall it after drying.
- Clean the remote control with a slightly damp cloth from time to time. We recommend using a cleaning cloth for glasses to clean the display.

Maintenance of the roof air conditioner

- Regularly check whether the condensation water drainage channels at the sides of the roof air conditioner are clear and the condensation water is able to escape.
- Check the seal between the roof air conditioner and the roof of the vehicle for cracks and other damage once per year.

9.0 Troubleshooting

If the roof air conditioner does not operate normally, please check the followings:

- Check the fuse or circuit breaker to see if it is open.
- If vehicle connected to generator, check to be sure the outlet power of generator matches the roof air conditioner, and producing power with stable voltage.
- If vehicle connected to power supply by a land line, check to be sure line is sized properly to run roof air conditioner load and it is plugged into power supply. Then, check to be sure the voltage of power supply is qualified. (The operation voltage of the unit is 220V).
- After above checks, call your supplier for further help if your roof air conditioner still fails to operate properly. This roof air conditioner must be maintained by qualified worker only.

Error Code	Problem	Solution
E1	Room temperature sensor malfunction	Check if the connection loosing; if not, replace the sensor. Check if 4-air outlet are open(at least 2 should be open).
E2	Indoor coil temperature sensor malfunction	Check if the connection to PCB loosing; or if copper sensor comes out; if not, replace the sensor.
E3	Poor cooling (the refrigerant charge is deficient, or the airflow is insufficient or the outdoor exhaust air vents are obstructed)	<ol style="list-style-type: none"> 1. Compressor is running(no wiring disconnected). 2. Check if ceiling panel installed correctly, ensure no air flow shorted. 3. Gas leakage happened, repairing is needed.
E4	Poor heating(the refrigerant charge is deficient)	<ol style="list-style-type: none"> 1. Compressor is running(no wiring disconnected); 2. Check if ceiling panel installed correctly, ensure no air flow shorted. 3. Gas leakage happened, repairing is needed.
E5	Anti-frozen protection at cooling	<ol style="list-style-type: none"> 1. Filter too dirty? Clean the filter. 2. Unit is running at a very low outside temperature(lower than 18° C)? Suggest to open window instead of running air conditioner cooling. 3. Four direction air outlet must have at least 2 open. 4. Indoor fan running at normal speed? If not, check the motor.
E6	Extra high temperature protection at heating mode	<ol style="list-style-type: none"> 1. Filter too dirty? Clean the filter. 2. Unit is running at a very high outside temperature(higher than 20° C)? Suggest to open window instead of running air conditioner heating. 3. Four direction air outlet must have at least 2 open. 4. Indoor fan running at normal speed? If not, check the motor.

10.0 Technical data

Model	KAC 33	KAC 25
Type	Electric auxiliary heating	Heat pump
Control type	Remote control	
Compressor cooling capacity	3180W	2500W
Input power cooling	1460W	1060W
Heating capacity	2000W	2500W
Input power Electric heater	2070W	990W
Rated input voltage	220V-240V 50Hz	
Power consumption in cooling mode	6.8A	4.8A
Power consumption in heating mode	9.1A	4.5A
Starting current compressor	19A	16A
Refrigerant	R410a	
Refrigerant quantity	800g	650g
Airflow High speed	480m ³ /h	480m ³ /h
Cable section and length	4mm ² copper and length not more than 8m.	2.5mm ² copper and length not more than 8m.
Circuit protection	20Amp fuse or circuit breaker, and the cable are not shared with other electrical appliances.	
Generator requirement	one roof air conditioner needs one 3.5Kw generator	one roof air conditioner needs one 2.5Kw generator
Dimensions L x W x H	996 x 728 x 252 mm (height above vehicle roof)	
Weight	42Kg	36Kg



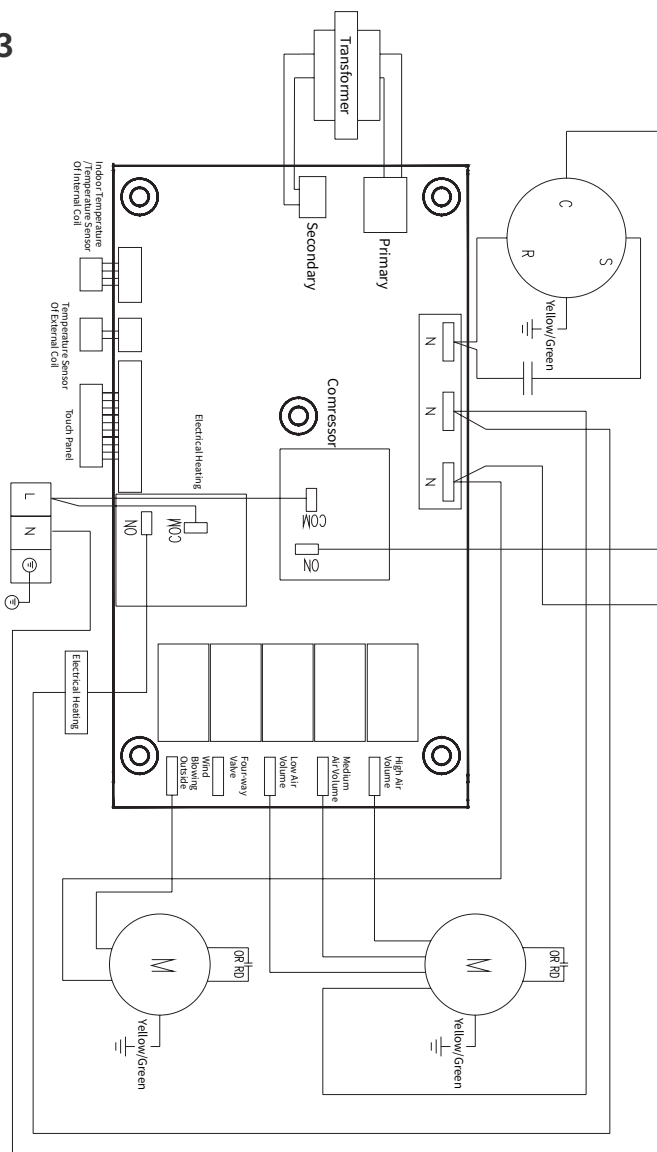
NOTE!

- To continuously improve our products, we reserve the rights to change some specifications without further notice, please check the data plate.

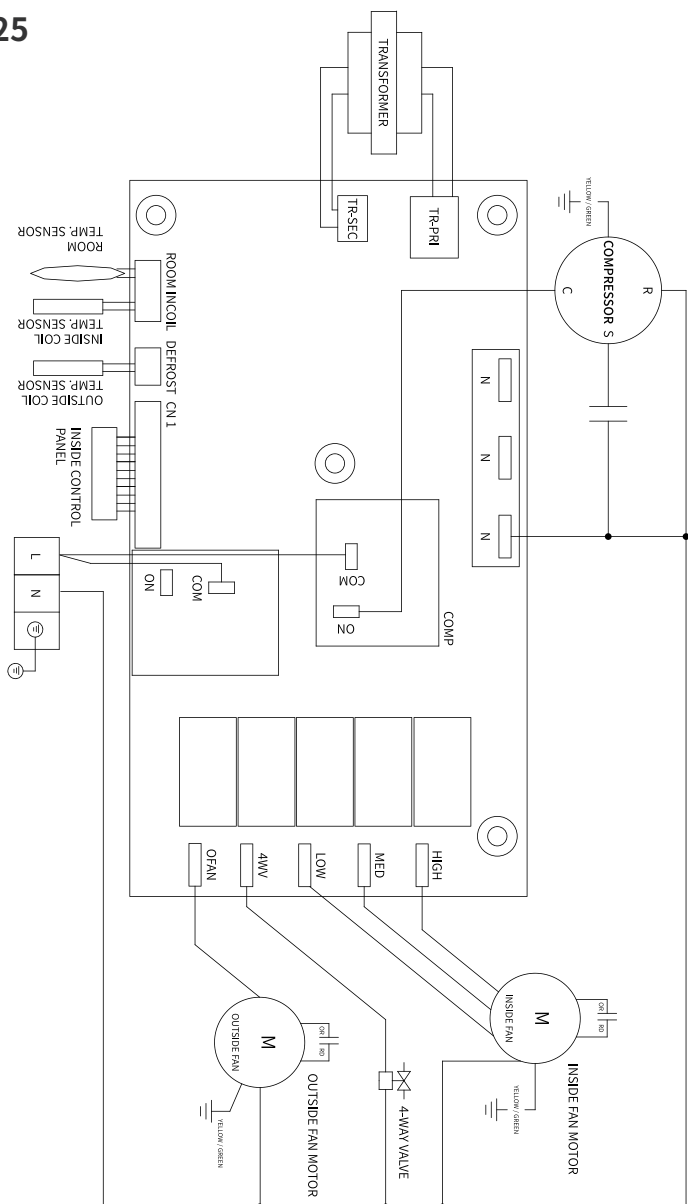
11.0 Wiring diagram

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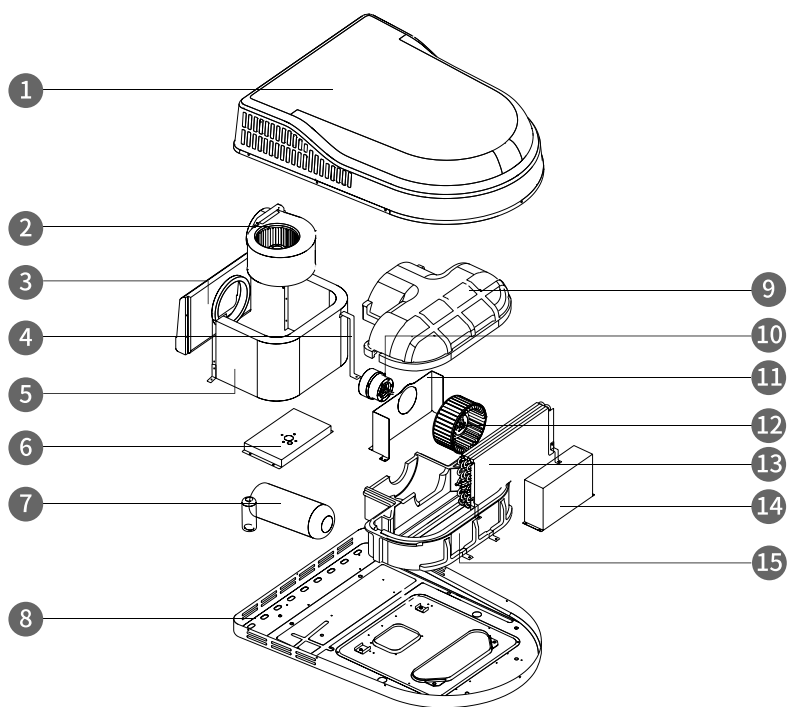
KAC 33



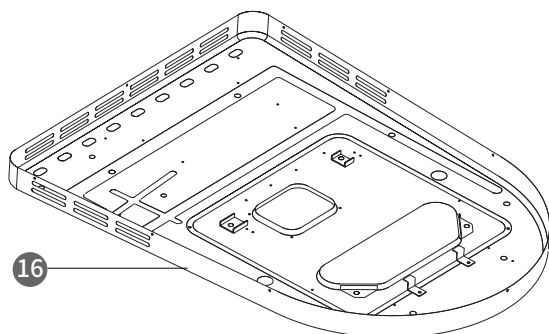
KAC 25



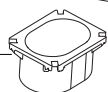
12.0 Parts list



1	Housing	9	Upper foam
2	External fan kit	10	Internal fan
3	External fan	11	Installation plate of internal fan
4	Fixing plate of condenser	12	Wind wheel
5	Condenser	13	Evaporator
6	Installation plate of external fan	14	Electric control box
7	Compressor	15	Lower foam
8	Base pan		



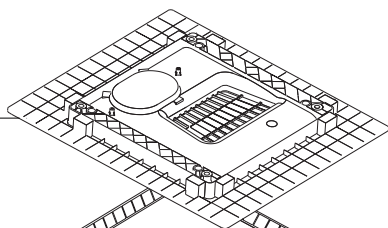
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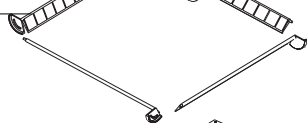
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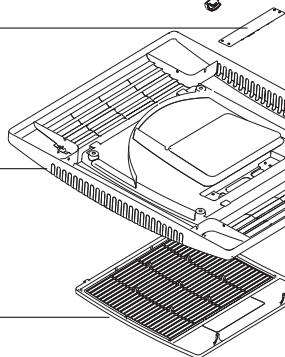
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16	Base pan
17	Lower air duct
18	Upper air duct
19	Mounting bracket
20	Louver
21	Display board
22	Panel
23	Return air grille

13.0 Warranty

The statutory warranty period applies. If the product is defective, please contact the nearest supplier in your location. For repair and guarantee processing, please prepare the following documents:

- A copy of the invoice with purchasing date.
- A reason for the claim or description of the fault.

No warranty claim shall be applicable under the following circumstances:

- Damage, accident or otherwise, to the air conditioner while in the possession of the consumer not caused by a defect in material or workmanship.
- Damage caused by consumer misuse, tampering, or failure to follow the care and special handling provisions in the instructions.
- Damage to the finish of the case, or other appearance parts caused by wear.
- Damage caused by repairs or alterations of the air conditioner by anyone other than those authorized by the manufacturer.



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