BEKS
THE VETS ORGANIZER

Introduction

Transporting temperature-sensitive goods, such as medicines, foodstuffs or biological samples, requires reliable cooling. A cool box in a vehicle is a commonly used solution for this.

Connecting the power supply correctly is crucial to maintaining the desired temperature and preventing damage caused by temperature fluctuations.

This essay discusses four different connection methods, including the consequences of each choice, cost estimates and connection diagrams. The importance of stable cooling and the impact of power supply choices are emphasised, with Mastervolt as a possible supplier of equipment.

Importance of reliable cooling and power supply

Stable cooling is essential for:

- **Medicines**: Many medicines lose their effectiveness at temperatures outside the range of 2–8°C.
- **Food**: Prevents spoilage and food poisoning.
- **Biological samples**: Maintaining integrity for research.

Power supply choices affect:

- **Temperature stability**: Fluctuations can lead to condensation and moisture in packaging.
- **Reliability**: A flat battery can cause critical situations.
- **Long-term costs**: Cheaper solutions can end up being more expensive due to spoilage or damage.

BEKS
THE VETS ORGANIZER

1. Direct connection to the 12V socket in the boot

Description

The simplest and cheapest option is to connect the cool box to the existing 12V socket in the boot. This socket is often connected directly to the vehicle battery and is powered when the engine is running.

Advantages

- **Inexpensive**: No additional equipment required.
- **Simple**: Plug-and-play solution.
- **Quick to install**: No technical knowledge required.

Disadvantages

- **Limited capacity**: The vehicle battery will quickly run out of power if the engine does not recharge it. At a consumption of 60 watts per hour (5 amps at 12V), a standard 60Ah battery will provide power for up to 12 hours before running out (without the engine/dynamo/alternator running).
- **Risk of deep discharge**: If the battery discharges too far, the car will no longer start.
- **Temperature fluctuations**: During prolonged periods of inactivity (e.g. overnight), cooling stops, which can lead to the deterioration of medicines. Moisture also forms in packaging due to condensation.

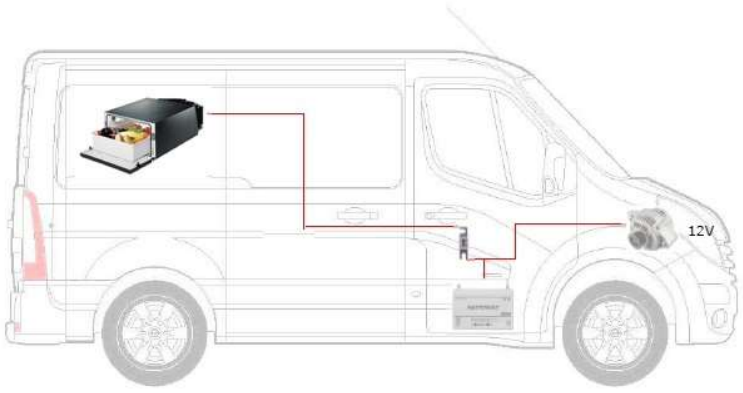
Consequences

- **Medicines**: Not kept at the correct temperature, possible loss of efficacy. Risk of damage to health.
- **Food**: Risk of spoilage. Risk of damage to health.
- **Packaging**: Risk of moisture build-up.
- **Vehicle**: Battery may be damaged by deep discharge.

Cost estimate

- **£0–£20**: Only a 12V plug and possibly an extra fuse.

Connection diagram



BEKS
THE VETS ORGANIZER

2. Connection to the 12V connection with battery monitor/battery guard

Description

Another option is to connect the cool box to a 12V connection in the engine compartment. This connection is directly connected to the vehicle battery and is powered when the engine is running. To prevent the battery from running flat, a battery guard is placed between the cooling system and the vehicle battery.

Advantages

- **Reasonably inexpensive**: Little additional equipment required.
- **Installation by a specialist**: Basic technical knowledge required.
- **No risk of deep discharge**: The battery cannot be over-discharged due to cooling.

Disadvantages

- **Limited capacity**: The power supply to the cooling system is quickly switched off when the engine is not running. At a consumption of 60 watts per hour (5 amps at 12V), a standard 60Ah battery will supply power for up to 2 hours before the battery monitor switches it off (without the engine/dynamo/alternator running).
- **Temperature fluctuations**: During longer periods of inactivity (e.g. at night), the cooling stops, which can lead to the deterioration of medicines. Moisture also forms in packaging due to condensation.

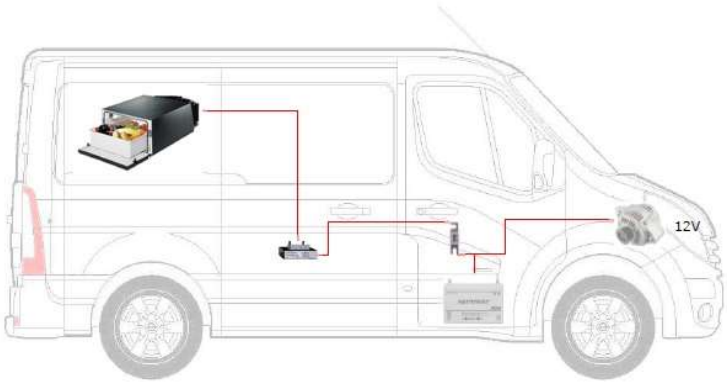
Consequences

- **Medicines**: Not kept at the correct temperature, possible loss of efficacy. Risk of damage to health.
- **Food**: Risk of spoilage. Risk of damage to health.
- **Packaging**: Risk of moisture build-up.
- **Vehicle**: Battery may be damaged by deep discharge.

Cost estimate

- **£150–£200**: Battery monitor, a 12V plug and possibly an extra fuse.

Connection diagram



BEKS
THE VETS ORGANIZER

3. Additional battery connected to the alternator

Description

An extra battery (e.g. an AGM or lithium battery) is connected to the vehicle's dynamo/alternator. This battery supplies the cool box with power, even when the engine is not running.

Advantages

- **Longer use**: Extra capacity ensures longer cooling without straining the starter battery.
- **More reliable**: Less risk of deep discharge of the starter battery.
- **More stable temperature**: Fewer fluctuations, better for sensitive contents.

Disadvantages

- **Cost**: Additional battery and charge controller are required.
- **Installation**: Requires technical knowledge or professional installation.
- **Weight**: Additional battery increases the weight of the vehicle.

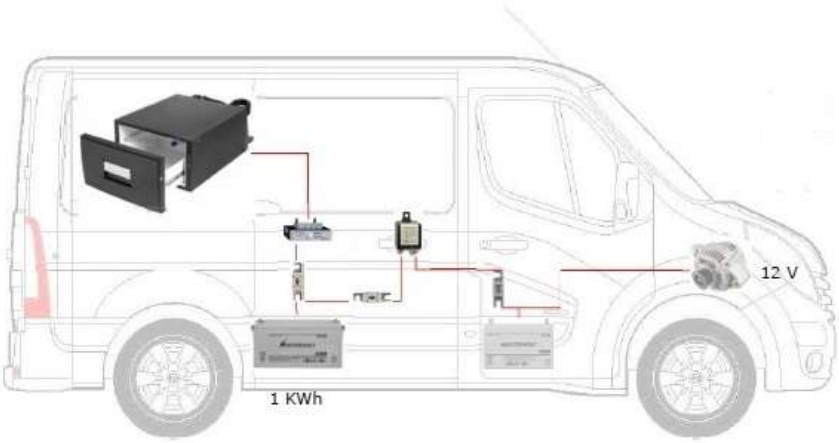
Consequences

- **Medicines**: Better protected against temperature fluctuations.
- **Food**: Longer shelf life.
- **Vehicle**: No risk of the starter battery running flat.

Cost estimate (Mastervolt)

- **AGM battery (100Ah)**: £170–£320
- **Lithium battery (100Ah)**: £500–£800
- **Battery separator or charge controller**: £45–£135
- **Installation**: £450 (if done professionally)

Connection diagram



BEKS
THE VETS ORGANIZER

4. Additional battery with overnight shore power charging

Description

In addition to being connected to the alternator, the extra battery is charged overnight via a trickle charger connected to shore power (230V). This ensures that the battery is fully charged when you set off.

Advantages

- **Maximum reliability**: Battery is always full when you set off.
- **Optimal cooling**: No interruptions, ideal temperature control.
- **Longer battery life**: Regular full charging extends the battery's life.

Disadvantages

- **Dependence on shore power**: Not always available (e.g. when camping).
- **Must be** connected and disconnected.
- **Costs**: Trickle charger and additional equipment are required.

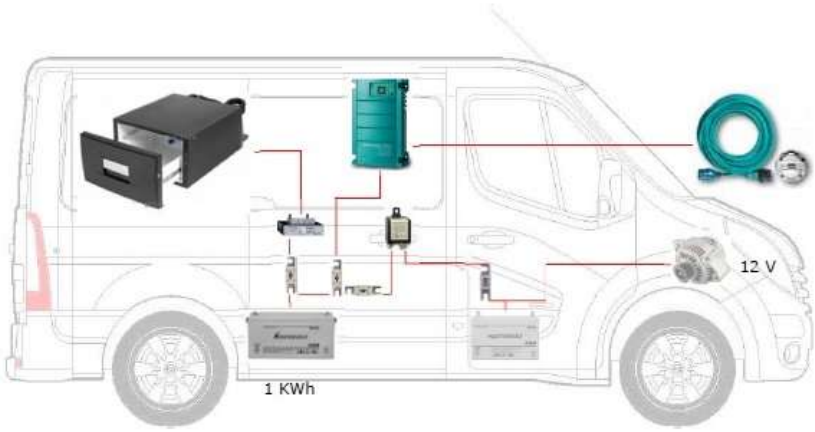
Consequences

- **Medicines**: Always at the correct temperature, no risk of spoilage.
- **Food**: Optimal shelf life.
- **Vehicle**: No strain on the starter battery.

Cost estimate (Mastervolt)

- **AGM battery (100Ah)**: £170–£330
- **Lithium battery (100Ah)**: £500–£850
- **Trickle charger (e.g. Mastervolt ChargeMaster)**: £85–£140
- **Installation**: £750 (if done professionally)

Connection diagram



BEKS
THE VETS ORGANIZER

Conclusion and recommendation

- **For occasional use**: A direct 12V connection with a battery monitor is sufficient, but risky for longer periods. It does not guarantee temperature maintenance.
- **For regular use**: An extra battery connected to the alternator is a good balance between cost and reliability. However, the engine must run for sufficient hours per day. It guarantees limited temperature maintenance.
- **For critical applications**: An extra battery with overnight shore power charging offers the best protection and is the most reliable solution. It guarantees temperature maintenance.

Eersel, 3 December 2025