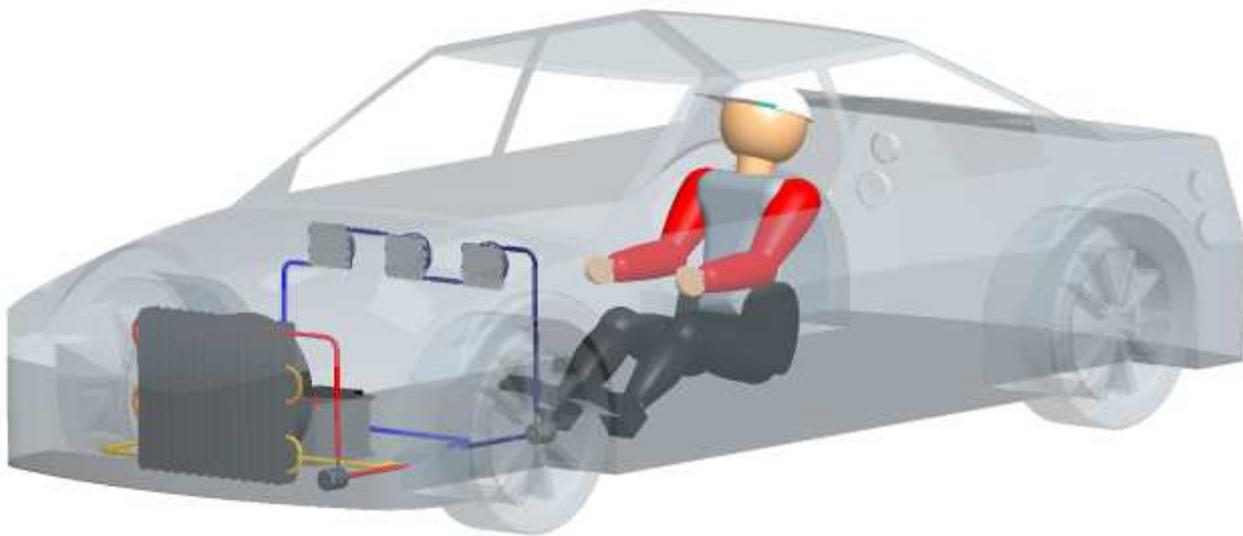
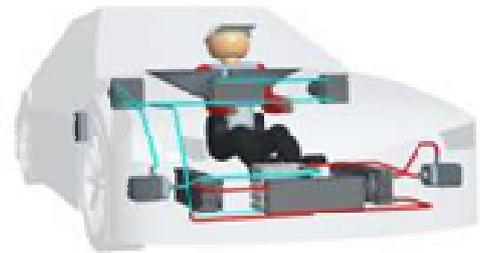


Manual

Build-in Electric car-airco

The Top-Cool Technology (TCT) is electrical powered. This makes it applicable to use it easily as a cooling-engine for a car airco-system

The unit is ideal to use it as cooling-engine in retro-fit applications such as old-timers. It can also be build-in occasions when there is desire for cooling when there isn't any airco-system implemented in the original car. It's also practical to use it as alternative for a defect existing airco.

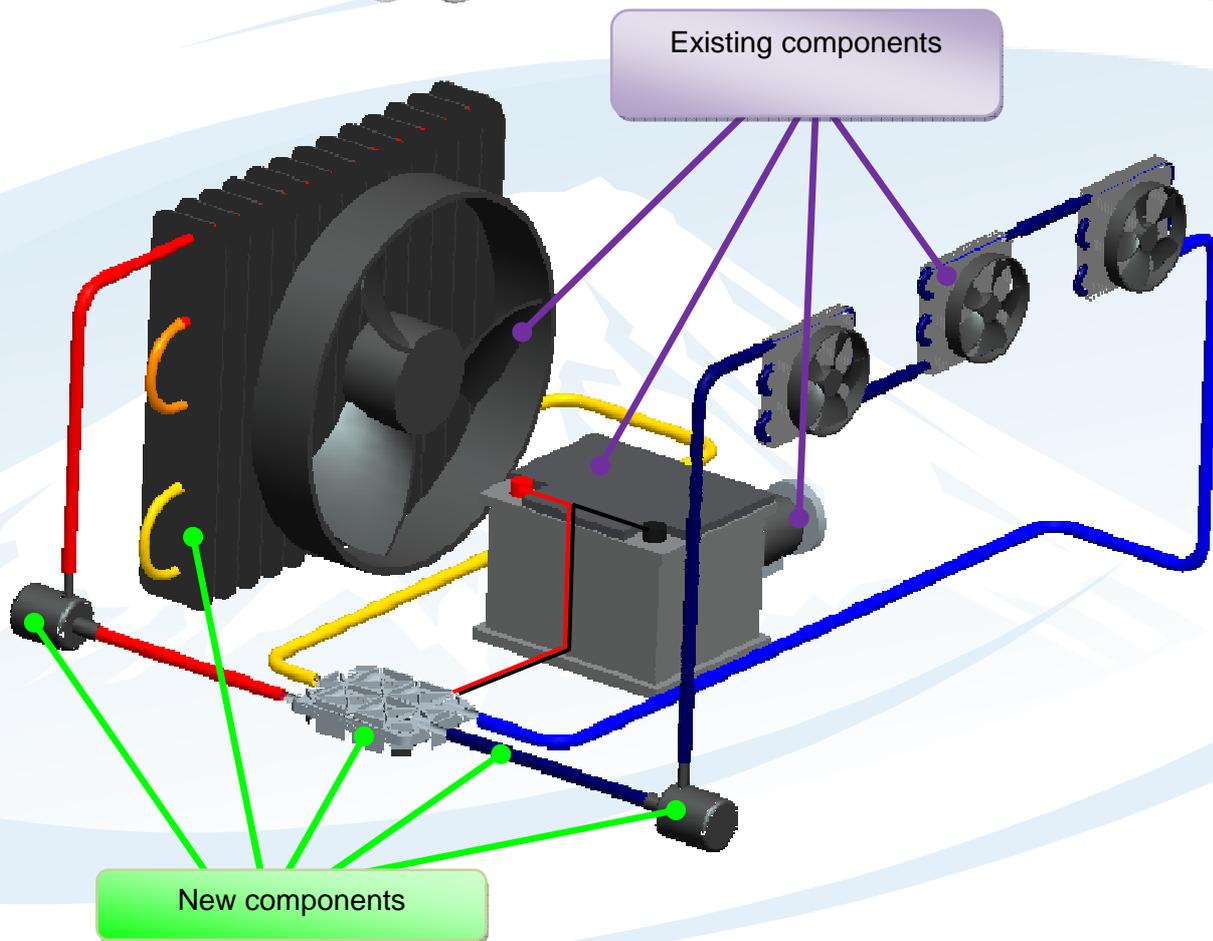
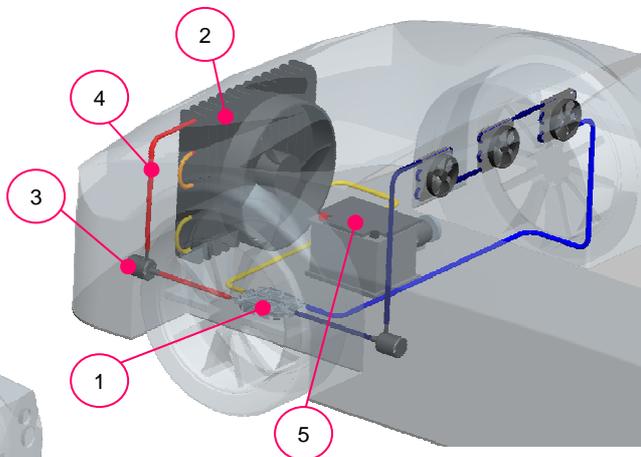
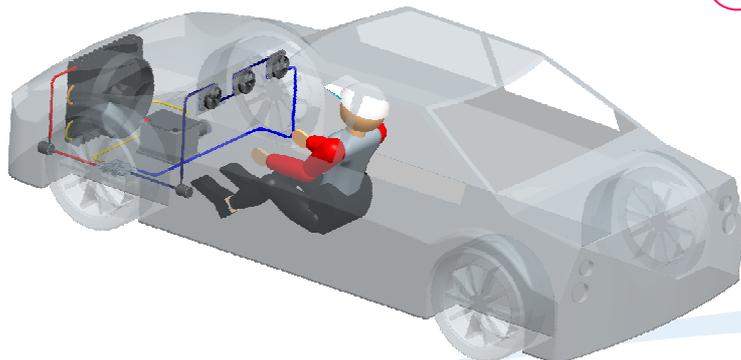


In this manual are some handy tips and recommendations how to build-in a cooling-system by yourselves by using the Top-Cool Technology.



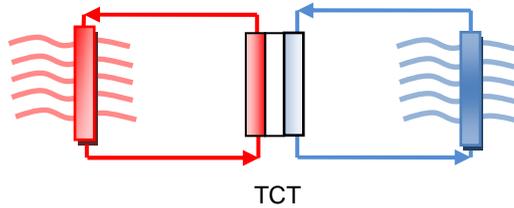
Below there are mentioned some actions needed for implementation in a car.

1. Placing the cooling engine (TCT-unit)
2. Placing an additional radiator.
3. Placing the circulation pumps
4. Connection with tubing
5. Electrical connection



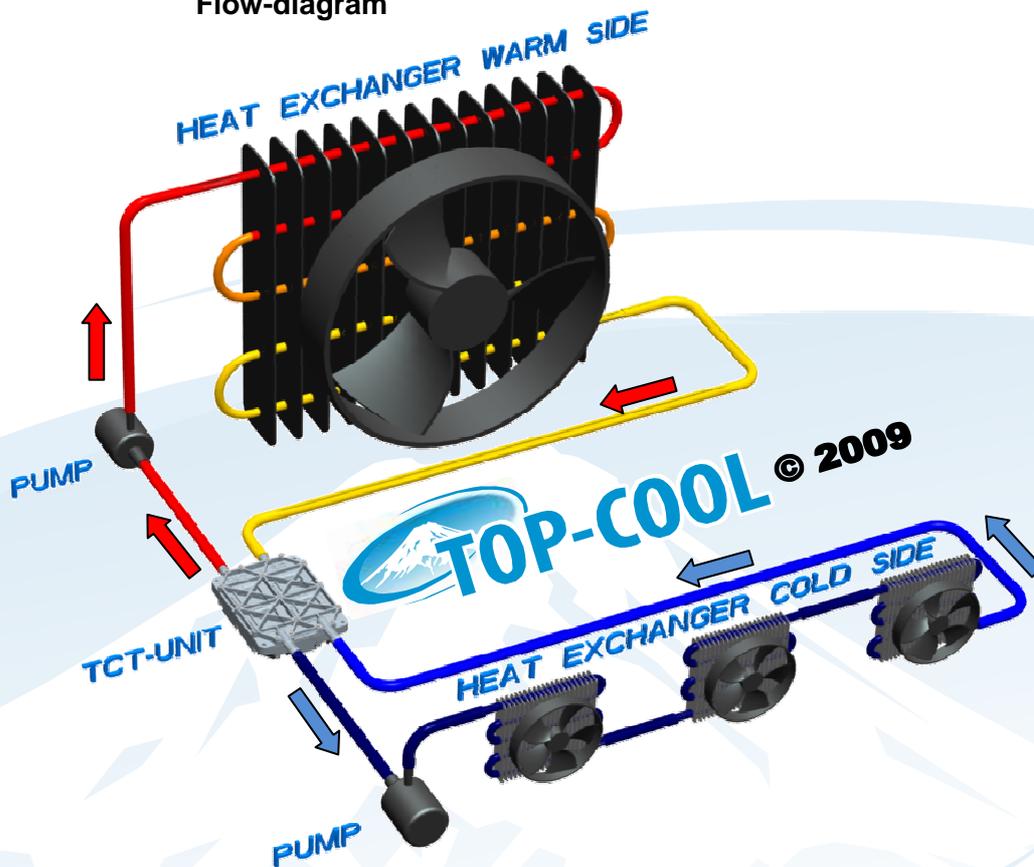
The airco-cooling-system exists of two separated fluid-circuits that are powered to the cooling-engine (TCT-unit).

Schematically as follows:



Below a flow-diagram with the real components of the car-airco

Flow-diagram



1. Placing the TCT-unit

It's possible to place the TCT-unit everywhere where possible. Also the position/direction of the unit is not important. Choose a place where there's less heat, for example, behind the fenders. This prevents that heat of the motor comes in to the cooling system what reduces the overall cooling.



Placing the cooling-engine behind the fenders (example).



2. Placing the additional radiator

For the exhaust of heat-energy, there must be placed an additional radiator. This radiator can be placed in front of the car-engine. In this area there is always claimed space for an additional radiator, because a regular radiator/condenser.

Tip: use always the biggest radiator that fits for an optimal heat-exhaust and highest cooling performance. Use a copper radiator rather than aluminium.

For a good cooling performance a good heat-exhaust is necessary.



3. Placing the circulation pumps

Place the pumps where space is available. Near the cooling-engine is preferred.

4. Connection with tubing

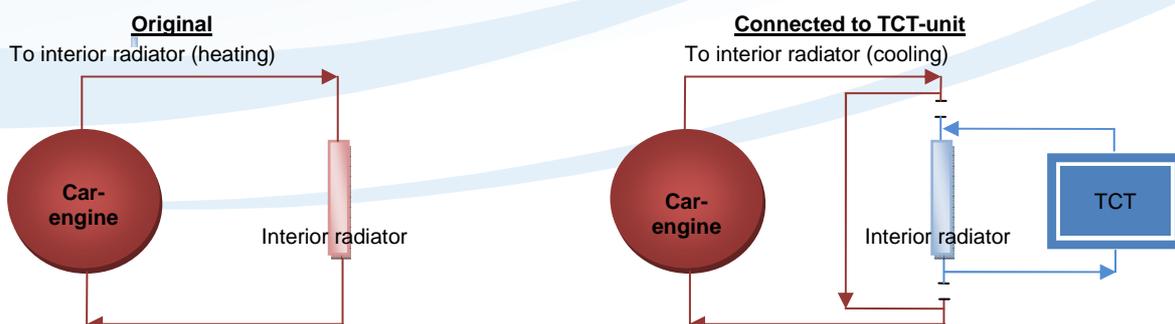
Warm circuit

Connect the warm-side of the TCT with the additional radiator with tubing. It is not necessary to insulate these tubing. Choose a smart routing for the tubing and prevent the possibility that buckling appears. Use angular connections rather than bends with small radii.

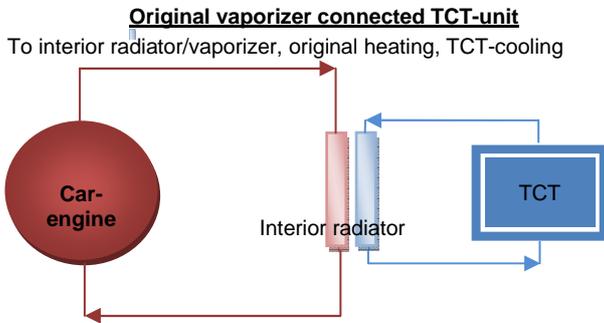
Note: when tubes are heat up, they will buckle easier.

Cold circuit

Connect the cold-side of the unit with tubing connected to the interior radiator.



It's also possible to connect the cold circuit to the original cold-radiator/vaporizer of the original airco-system (when available).



Existing airconductors can be used to devide the cool airflow



Note: insulate the tubing of the cold-side and try to keep distance to the interior radiator close.

5. Electrical connection

The TCT-unit is powered by an electrical source.
 The cooling-engine can be connected to the battery or directly to the generator.



The cooling power of the TCT-unit depends on the available electrical power.
 The electrical power that's available, is transferred into an equal capacity of cooling power.(depending of the unit used)

The "over-capacity" of the battery/generator, can be used to power the TCT-unit. The user can also decide to exchange the generator with a stronger one. Also an additional generator allows full power to the cooling-engine and results in high performance cooling.

Additional items.

Turn on/off

The unit can be turned on and of with a regular switch connected to a relais.

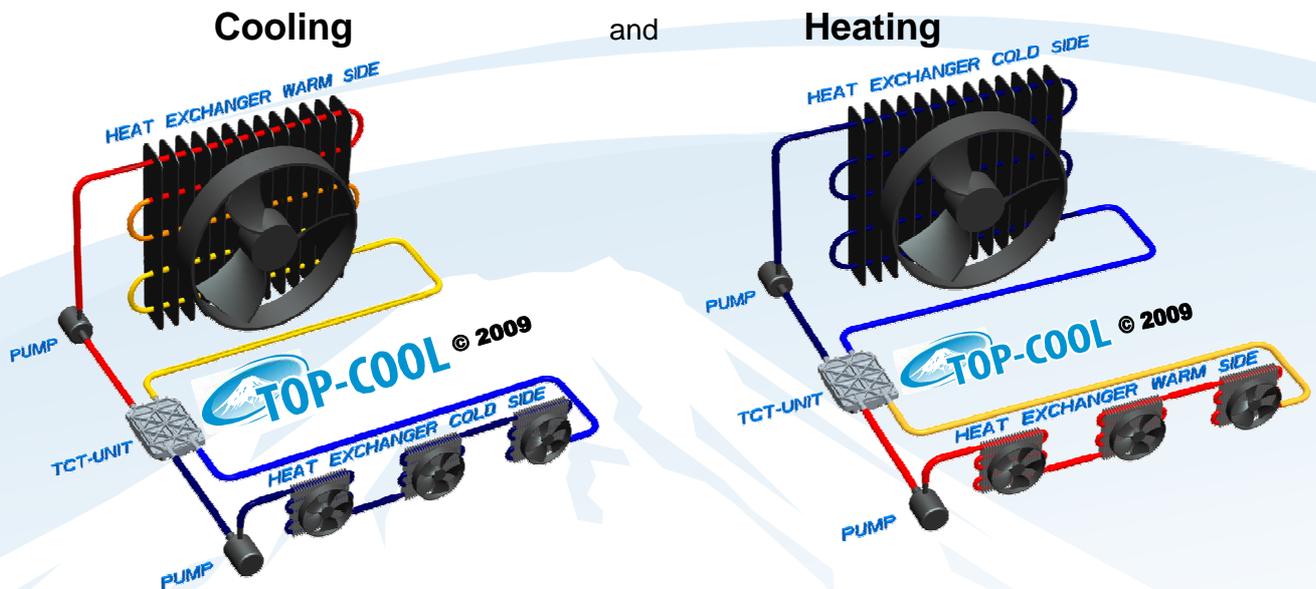
Controlling

The TCT-unit can be connected to a controller. The controller will turn the unit automatically on and off when the set temperature is reached.

Cooling and heating

When you want to use the system also as alternative heating, the circuits are switched the otherway around. The “cold-side” becomes hot and the “warm-side” becomes cold. In this situation the heating capacity/COP is about 200%

See figure below:



To realise this, a relais is needed to switch the positive pole into the negative.
 Note: use only components that can switch a large electric current into DC.

Remarks:

- The TCT-unit can only be used and powered by the electric source if both sides of the unit have an active liquid flow !
- Always ensure that proper heat exhaust is established

Tips:

- Use antifreeze (to prevent freezing in winter periods)
- When first time connected, run system **without** electrical connection of TCT-unit.

Questions and answers:

- Cooling performance is limited
 - ➔ Try to insulate the cold parts as good as possible to prevent loss of cooling power.
 - ➔ Place a bigger/better additional radiator for better heat exhaust and cooling performance.
 - ➔ Use more TCT-units for higher cooling performance (additional electrical power may be needed)
- I've difficulties with filling the system
 - ➔ Always ensure that pumps have sufficient inlet when filling the system. Avoid air entrance to the pump.
 - ➔ Use a reservoir to collect air in the circuits.