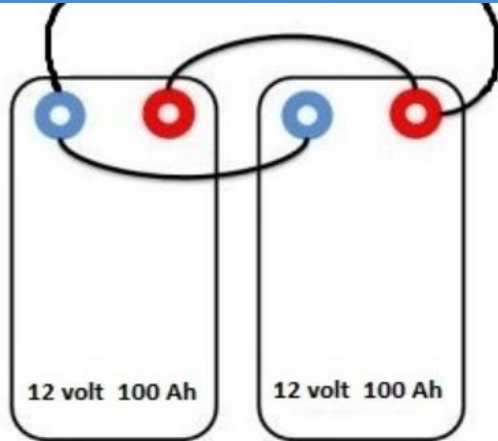


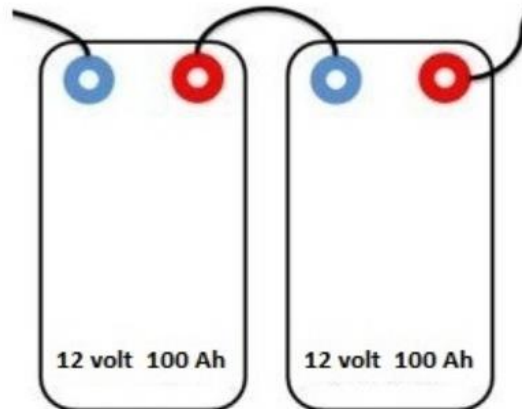


## Battery bank design

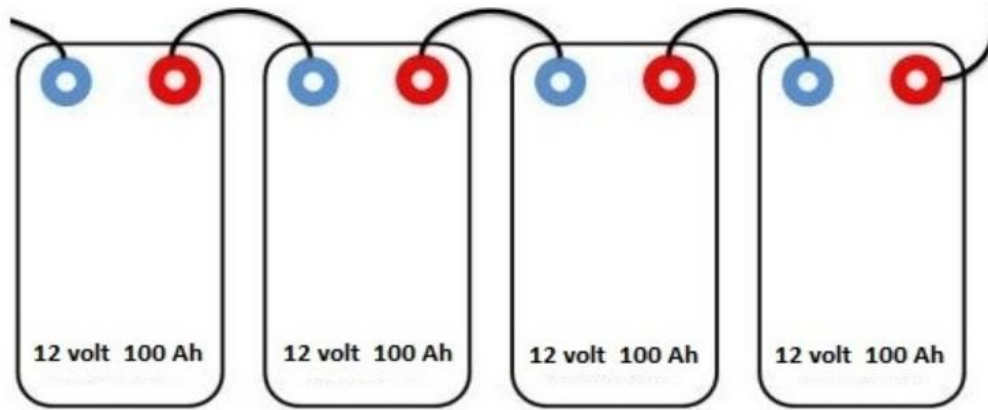
# Battery connections- 12- 24 – 48 volt



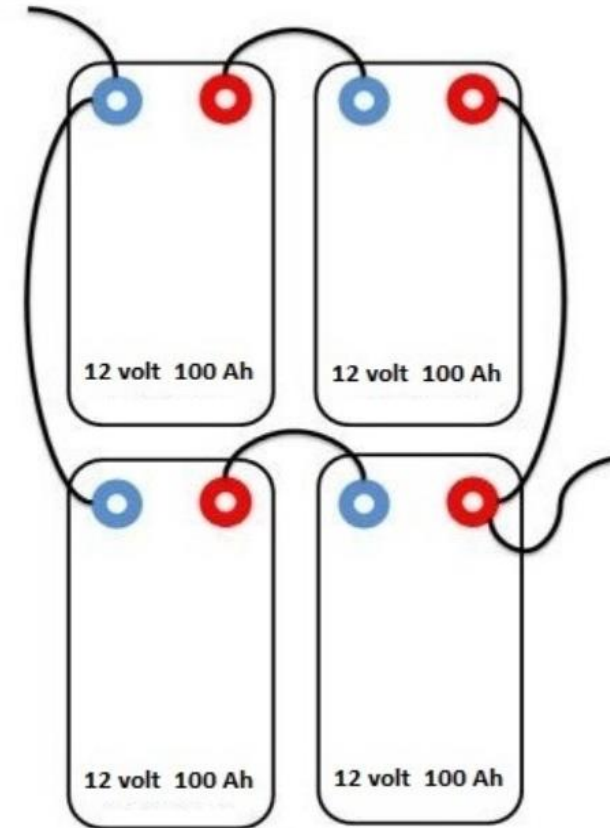
**Parallelschakeling 12 volt 200 Ah**



**Serieschakeling 24 volt 100 Ah**



**Serieschakeling 48 volt 100 Ah**

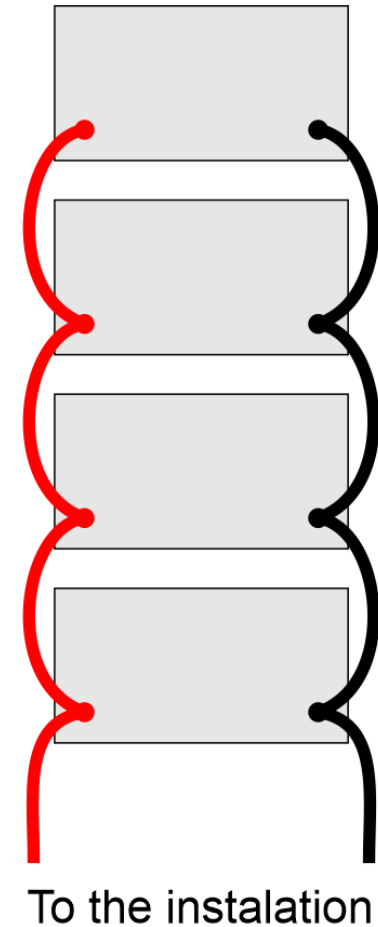


**Serie- parallelschakeling 24 volt 200 Ah**

# Common battery bank wiring mistake

This is a diagram showing the way people often interconnect multiple batteries to form one large battery bank.

Each connection creates a little resistance over the cable, the crimp terminals and the battery screw terminal.

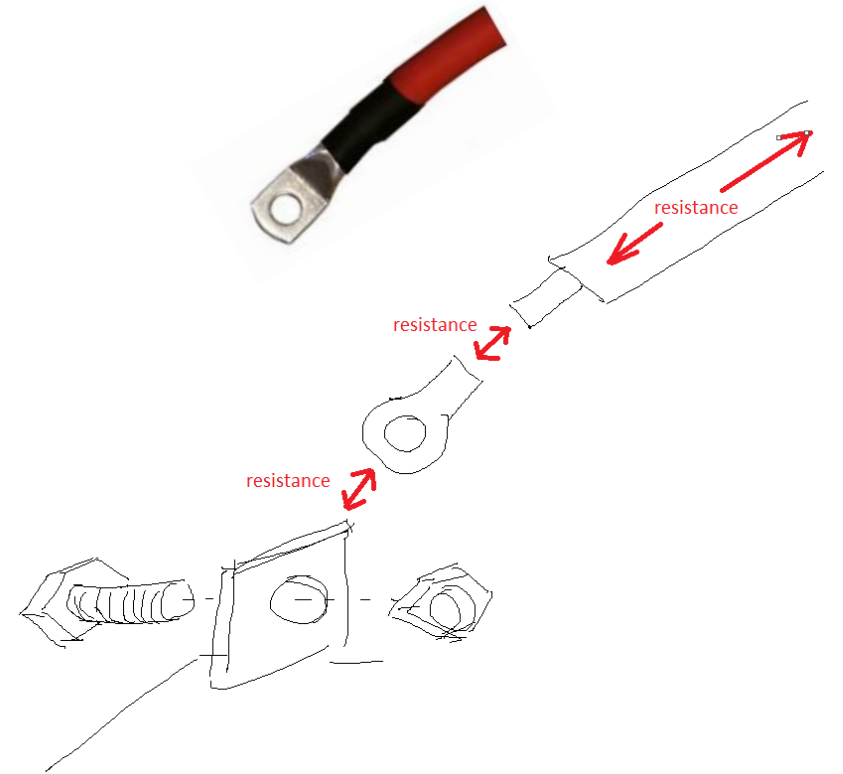


# Cable resistance

To give an indication of this, the total resistance for a 20cm 35 mm<sup>2</sup> interconnecting cable is about 1,5 mΩ

You might say that 1.5 mΩ is not much. But the internal resistance of the actual battery is also low. Therefore it does matter a lot!

The internal resistance of a battery is typically between the 10 to 3 mΩ

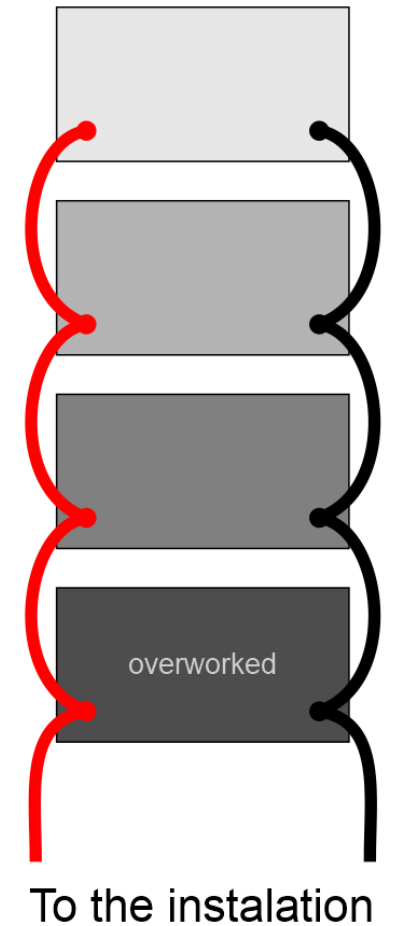


# What happens when a load is connected?

The power coming from the bottom battery only has to travel through the main connection leads.

The power from the next battery has to travel through the main connection and through the 2 interconnecting leads to the next battery.

The next battery up has to go through 4 sets of interconnecting leads. The top one has to go through 6 sets of interconnecting leads. The top battery will be providing much less current than the bottom battery.



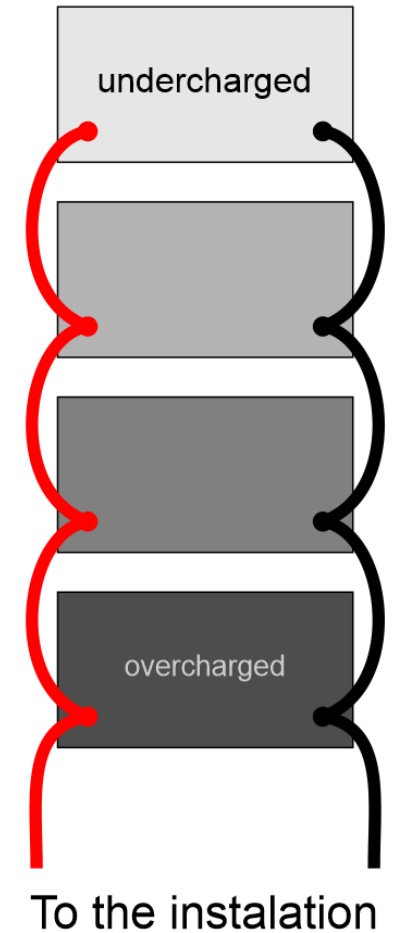
# What happens if the battery bank is being charged?

The bottom battery gets charged with a higher current than the top battery.

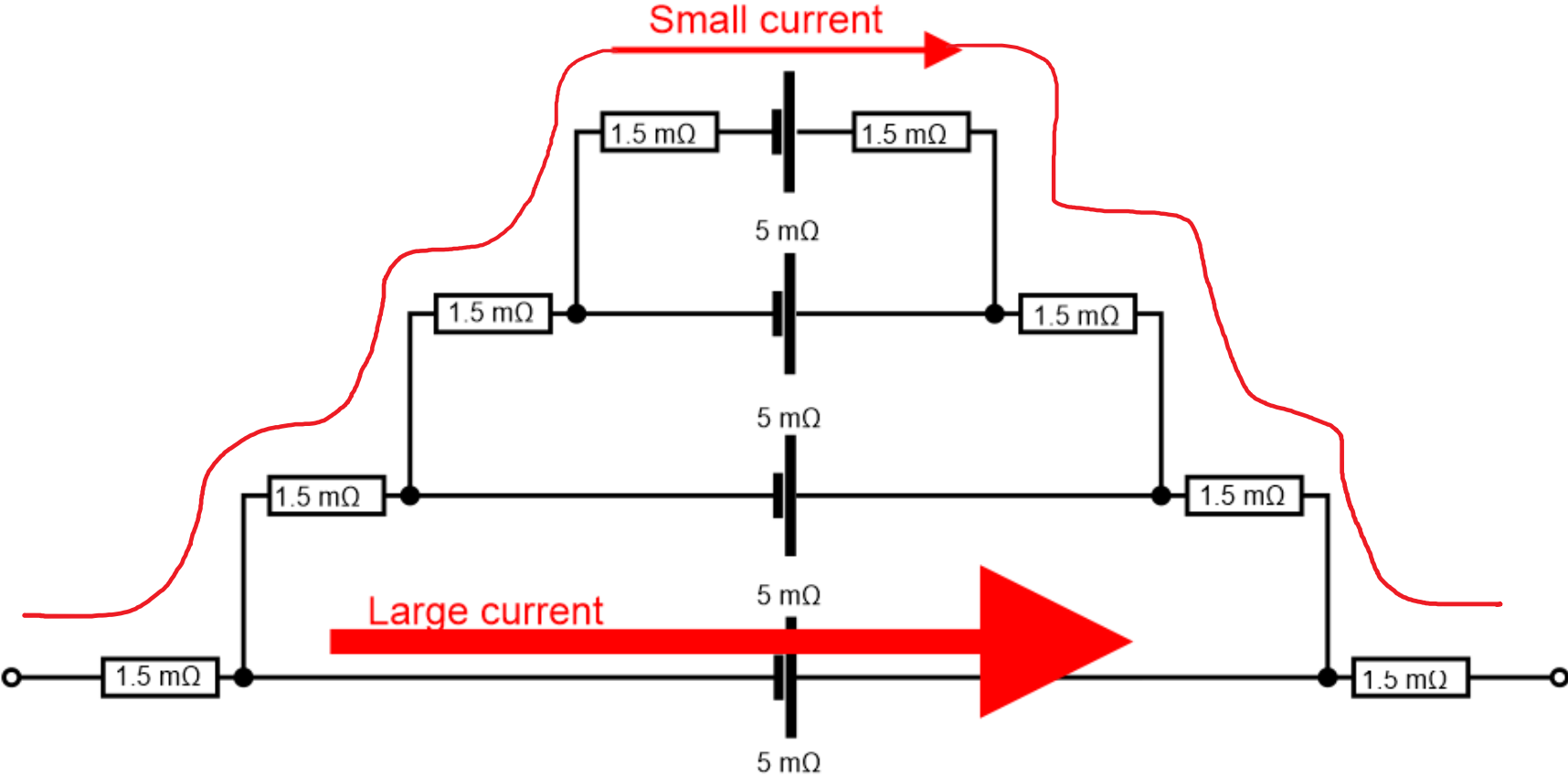
The top battery gets charged with a lower voltage than the bottom battery

The result is that the bottom battery is worked harder, discharged harder, charged harder.

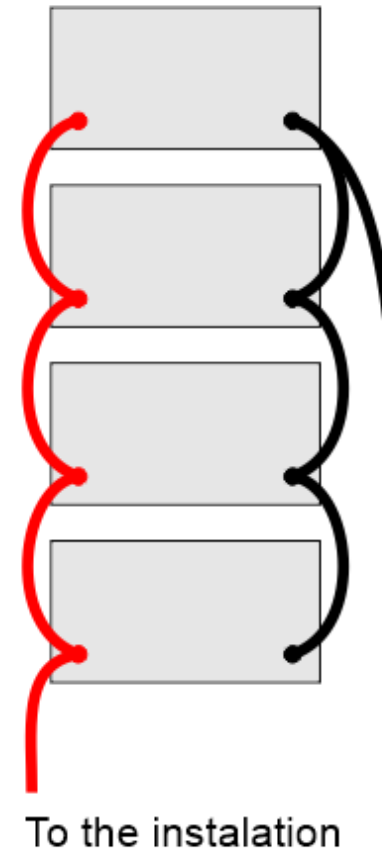
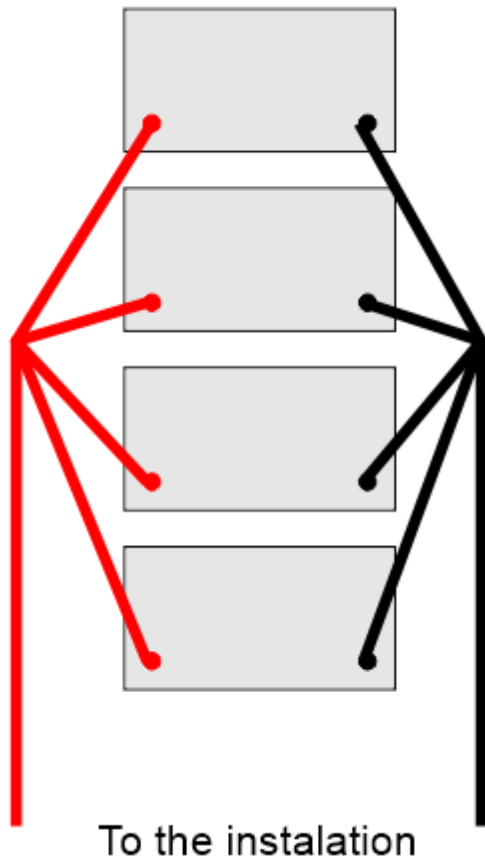
The bottom battery will fail prematurely



# The battery bank and wiring resistances

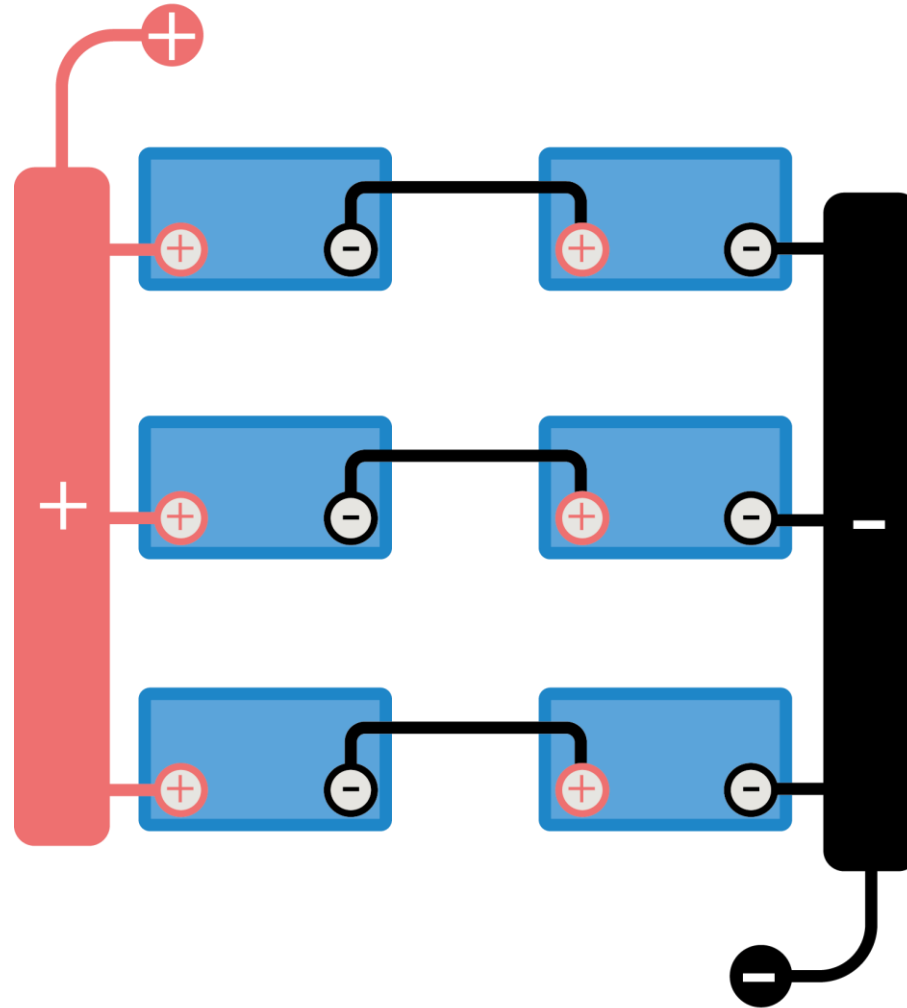


# The correct way





The best and the most correct way to connect, with a bus bar .



# Busbars

