APPLICATION NOTE

TORKEL 800/900 connected to grounded battery systems (above max voltage)

To test a battery system with a higher voltage than the specified max voltage the system can be divided into segments, each with lower voltage and within the specified range. In these cases, it is critical to consider the grounding of the battery system. This application note explain those cases and describe a correct procedure.

This notification/information is not a consequence of any design change or modification on the TORKEL. Only a detailed description of a testing procedure.

The table below describes the voltage levels for the different models.

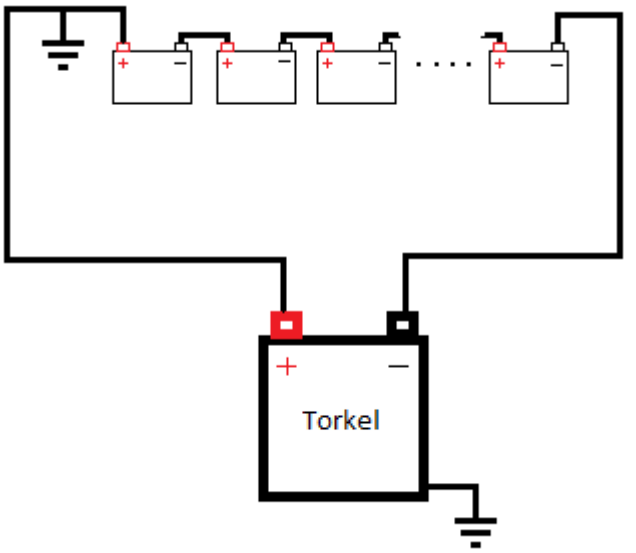
Product	Voltage definitions	
	Max rated battery voltage: Voltage between battery input poles (V1)	**Max rated voltage**: Voltage between a battery input and ground (V2)
TORKEL 840	288	480
TORKEL 860	480	480
TORKEL 910	300	500
TORKEL 930	300	500
TORKEL 950	500	500

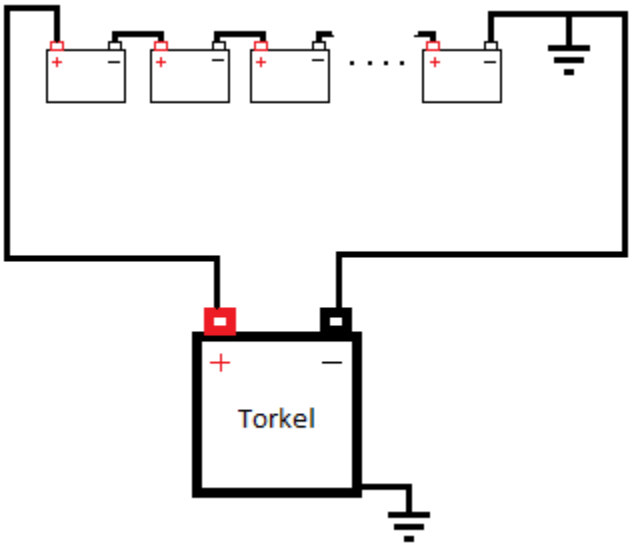
Please note!

- *The voltage between TORKEL's two battery input poles shall not exceed max battery rated voltage (V1) as specified in the table.*
- *The voltage between TORKEL's battery input and ground shall not exceed max rated voltage (V2) as specified in the table.*

1. Grounded battery systems with battery voltage less than TORKEL's max voltage

When the TORKEL is connected to a battery system that has a voltage less than the max rated TORKEL battery voltage (V1) it doesn't matter if the battery system is minus or plus grounded.





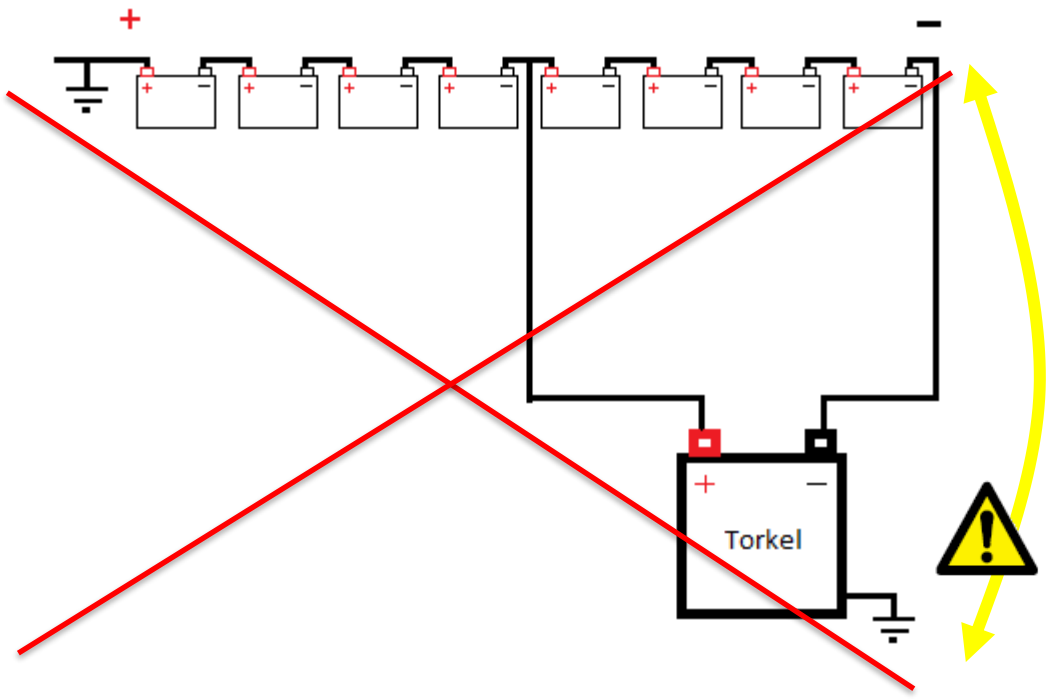
2. Grounded battery systems with battery voltage exceeding TORKEL's max voltage

When the TORKEL is connected to a battery system that has a total voltage exceeding TORKEL's max rated battery voltage (V1), the battery system needs to be divided in segments. The voltage of each segment needs to be less than TORKEL's max rated battery voltage (V1) to be able to perform a test. In this case the voltage between TORKEL's battery input and ground might exceed the max rated voltage (V2) and extra precaution must be taken.

TORKEL connected to positive grounded battery system.

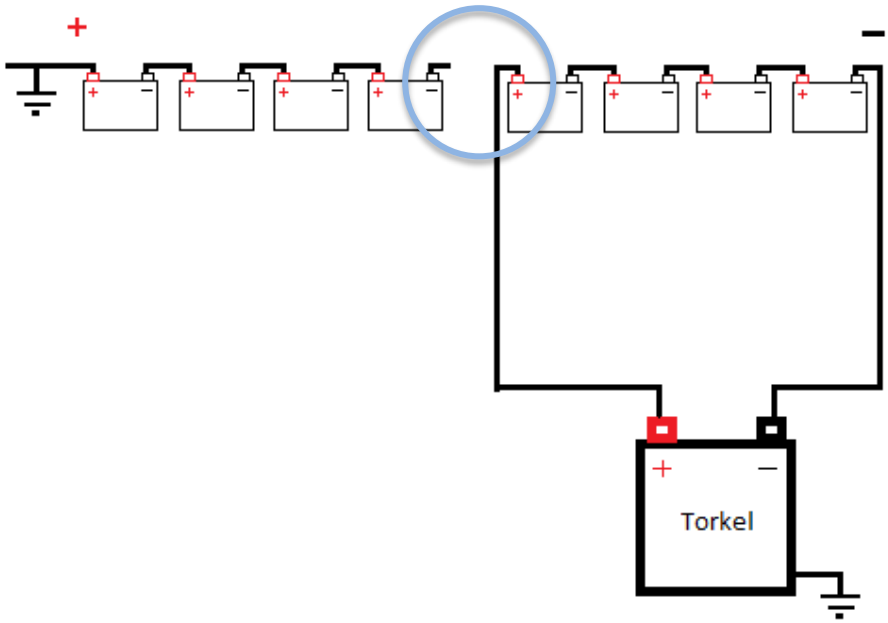
When connected as the picture below, TORKEL's battery input voltage is within specification (V1). But the voltage between TORKEL's negative battery input and ground is exceeding the allowed voltage between battery input and ground (V2).

In this example the potential that is above specification is indicated with the yellow line and warning symbol. This voltage will exceed max rated voltage (V2). This hook up must not be used.

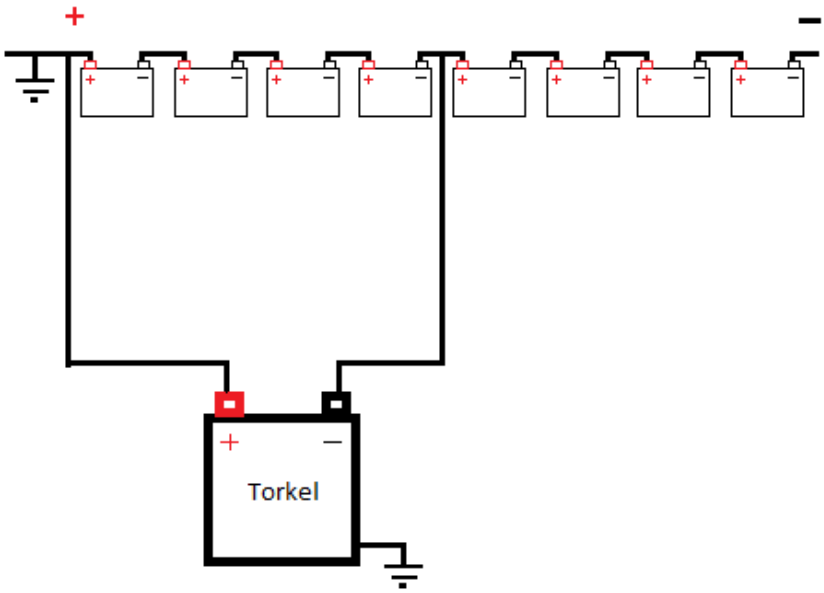


This hook up is not allowed.

To be able to perform the test in this situation. The battery system section that is tested, needs to be isolated from the battery system's grounded plus pole by a physical disconnection. See below picture. The blue circle indicates where the physical disconnection has been made.



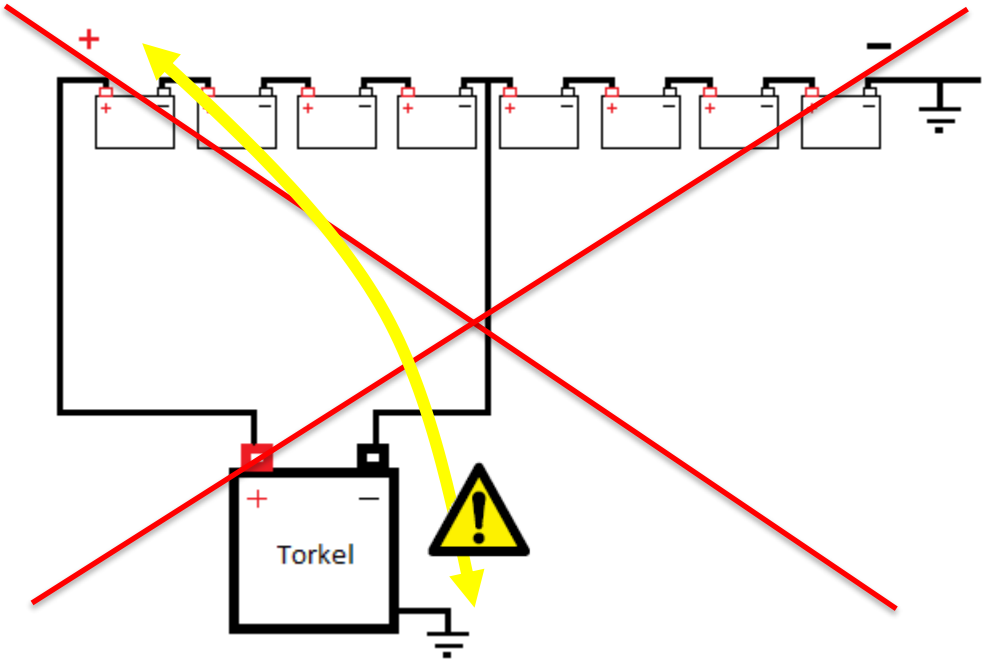
It is no problem to connect the TORKEL to the grounded section of the battery system since max allowed voltage to ground will not be exceeded. See below picture.



TORKEL connected to negative grounded battery system.

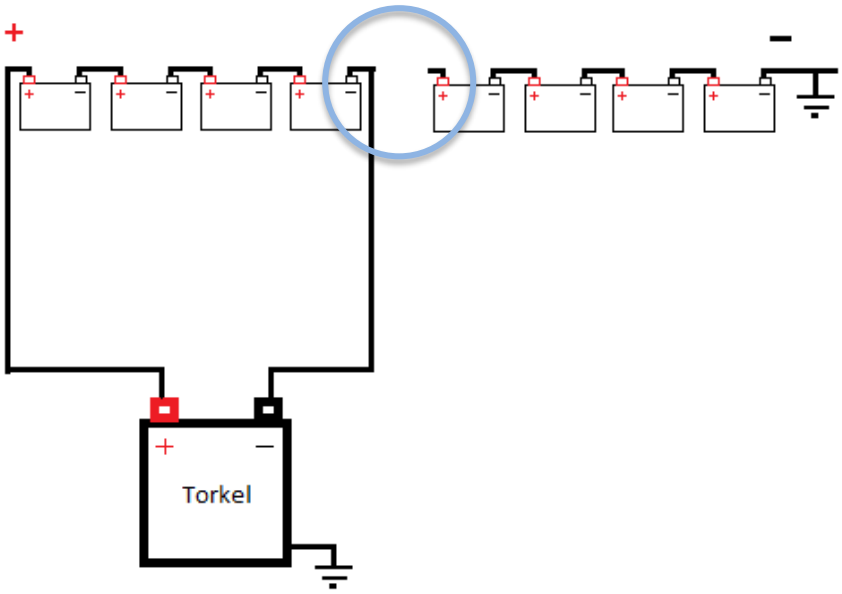
When connected as the picture below, TORKEL's battery input voltage is within specification (V1). But the voltage between TORKEL's positive battery input and ground is exceeding the allowed voltage between battery input and ground (V2).

In this example the potential that is above specification is indicated with the yellow line and warning symbol. This voltage will exceed max rated voltage (V2). This hook up must not be used.

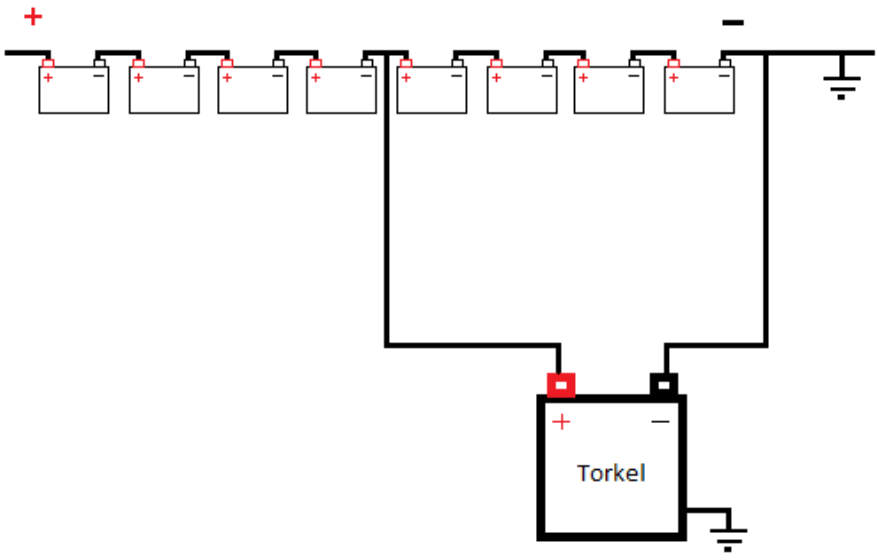


This hook up is not allowed.

To be able to perform the test in this situation. The battery system section that is tested, needs to be isolated from the battery system's grounded minus pole by a physical disconnection. See below picture. The blue circle indicates where the physical disconnection has been made.



It is no problem to connect the TORKEL to the grounded section of the battery system since max allowed voltage to ground will not be exceeded. See below picture.



TORKEL connected to mid-grounded battery system.

It is no problem to connect the TORKEL to either side of mid-grounded system, as long as the max voltage between battery input poles (V1) is not exceeded. See below picture.