CLAIMS

1. An electric power system (10) for an electric vehicle (300), comprising:

a first battery unit (20) including a first accumulator, and

a second battery unit (30) including a second accumulator,

a battery controller (100) comprising

a first charging current path (101C) and a first discharging current path (101D) connected to the first battery unit (20),

a second charging current path (102C) and a second discharging current path (102D) connected to the second battery unit (30),

a third charging current path (103C) and a third discharging current path (103D) for a connection with an electric control system (40) of the vehicle (300),

a first power switch (111) between the first discharging current path (101D) and the third discharging current path (103D),

a second power switch (112) between the second discharging current path (102D) and the third discharging current path (103D), and

a controlling unit (120) configured to set the first power switch (111) and the second power switch (112) based on a state of the first accumulator in the first battery unit (20) and/or a state of the second accumulator in the second battery unit (30), and

wherein at least one of the first (20) and second battery units (30) is a swappable battery unit, and

the controlling unit (120) is powered via the first discharging current path (101D) via a first diode and/or via the second discharging current path (102D) via a second diode.

2. The electric power system (10) of claim 1, wherein the controlling unit (120) comprises a logic circuit configured to regulate a charging behavior of the first accumulator and the second accumulator.

3. The electric power system (10) of claim 2, wherein the logic circuit is configured to, when charging:

- determine a lower charge state and a higher charge state among the first accumulator and the second accumulator;

- send a charge enable command to that battery unit of the first and second battery units having the lower charge state;

- send a charge enable command to that battery unit of the first and second battery units having the higher charge state, when a difference of the higher charge state and the lower charge state is lower than a pre-determined charging threshold.

4. The electric power system (10) of any one of the previous claims, wherein the controlling unit (120) is configured to, when discharging:

- determine a lower charge state and a higher charge state among the first accumulator and the second accumulator;

- close the one of the first power switch (111) and the second power switch (112) corresponding to the one of the first accumulator and the second accumulator having the higher charge state;

- open the one of the first power switch (111) and the second power switch (112) for interrupting a discharge of that accumulator of the first and the second accumulators having the lower charge state when a difference of the higher charge state and the lower charge state is higher than a pre-determined discharging threshold.

5. The electric power system (10) of any one of claims 2 to 4, wherein

the logic circuit is further configured to receive a stop command from the electric control system (40) and, upon receiving the stop command, setting each of the first power switch (111) and the second power switch (112) to open.

6. The electric power system (10) of any one of the previous claims, wherein the first power switch and/or the second power switch are solid state switches, optionally MOS transistors.

7. The electric power system (10) of any one of the previous claims, wherein each of the first battery unit (20) and the second battery unit (30) is a swappable battery unit.

8. The electric power system (10) of any one of the previous claims, wherein the first battery unit (20) includes a first internal charging switch (211) between the first accumulator and the first charging current path (101C), and includes a first internal discharging switch (212) between the first accumulator an the first discharging current path (101D), and

wherein the second battery unit (30) includes a second internal charging switch between the second accumulator and the second charging current path (102C), and includes a second internal discharging switch between the second accumulator an the second discharging current path (102D), and

wherein the controlling unit (120) is configured to set the first and second internal charging switches and/or the first and second discharging switches of the first and second battery units (20, 30).

9. A method of operating the electric power system of any of the previous claims comprising:

setting the first power switch (111) and the second power switch (112) includes when the electric control system (40) is charging, the steps of:

- determining a lower charge state and a higher charge state among the first accumulator of the first battery unit (20) and the second accumulator of the second battery unit (30);

- sending a charge enable command to that battery unit of the first and the second battery units (20, 30) having the lower charge state;

- sending a charge enable command to that battery unit of the first and the second battery units (20, 30) having the higher charge state when a difference of the higher charge state and the lower charge state is lower than a pre-determined charging threshold; and

when the electric control system (40) is discharging the steps of:

- determining a lower charge state and a higher charge state among the first accumulator of the first battery unit (20) and the second accumulator of the second battery unit (30);

- closing the corresponding power switch of the first and second power switches (111, 112) for discharging that accumulator of the first and the second accumulators having the higher charge state;

- opening the corresponding power switch of the first and second power switches (111, 112) for interrupting a discharge of that accumulator of the first and the second accumulators

having the lower charge state when a difference of the higher charge state and the lower charge state is higher than a pre-determined discharging threshold.

10. A battery controller (100) for an electric power system (10) of an electric vehicle (300), the electric power system (10) comprising a first battery unit (20) including a first accumulator, and a second battery unit (30) including a second accumulator, the battery controller (100) comprising:

a first charging current path (101C) and a first discharging current path (101D) connectable to the first battery unit (20),

a second charging current path (102C) and a second discharging current path (102D) connectable to the second battery unit (30),

a third charging current path (103C) and a third discharging current path (103D) for a connection with an electric control system (40) of the electric vehicle (300),

a first power switch (111) between the first discharging current path (101D) and the third discharging current path (103D),

a second power switch (112) between the second discharging current path (102D) and the third discharging current path (103D), and

a controlling unit (120) configured to set the first power switch (111) and the second power switch (112) based on a state of the first accumulator in the first battery unit (20) and/or a state of the second accumulator in the second battery unit (30),

wherein the controlling unit (120) is configured to set first and second internal charging switches (311C, 312C) of the first and second battery units (20, 30) and the first and second discharging switches (311D, 312D) of the first (20) and second battery units (30), and

the controlling unit (120) is powered via the first discharging current path (101D) via a first diode and/or via the second discharging current path (102D) via a second diode.

11. A vehicle (300) comprising the electric power system (10) according to any one of the claims 1 to 8.

12. The vehicle (300) of claim 11 further comprising an electric motor electrically coupled to the electric control system (40).

13. The vehicle (300) of claim 12 being an electric scooter.