



AC ripple in a DC system

Ripple, where does it come from ?

The screenshot shows the Victron Quattro software interface. The 'General' tab is selected, and the 'Udc ripple' parameter is highlighted with a red box. The interface includes various settings for system frequency, parallel systems, and internal transfer switch.

Quattro

UMains	---	V
IMains	---	A
UOut	---	V
IOut	---	A
Udc	---	V
Udc ripple	---	V
Iac	---	A
Freq. Out	---	Hz
Freq. In	---	Hz
SoC	[Progress Bar]	
Ignore AC aux. relay	---	

General | Inverter | Charger | Battery monitor | Virtual switch

System frequency

50Hz 60Hz

Parallel systems

Number of slaves: 0

Internal transfer switch

Accept wide input frequency range (45-65 Hz) Ground relay

AC low disconnect: 180 V AC high connect: 265 V

AC low connect: 187 V AC high disconnect: 270 V

UPS function

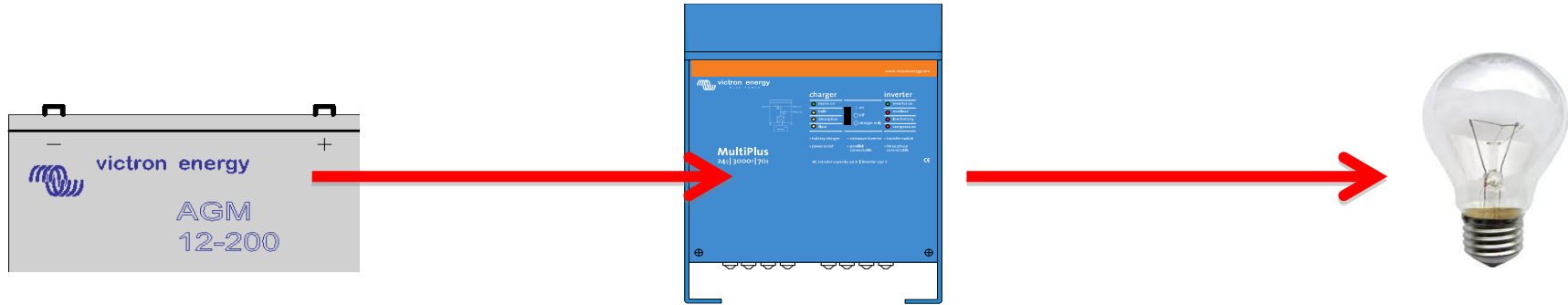
Dynamic current limiter

AC1 input current limit: 50.0 A Overruled by remote (priority)

AC2 input current limit: 30.0 A Overruled by remote

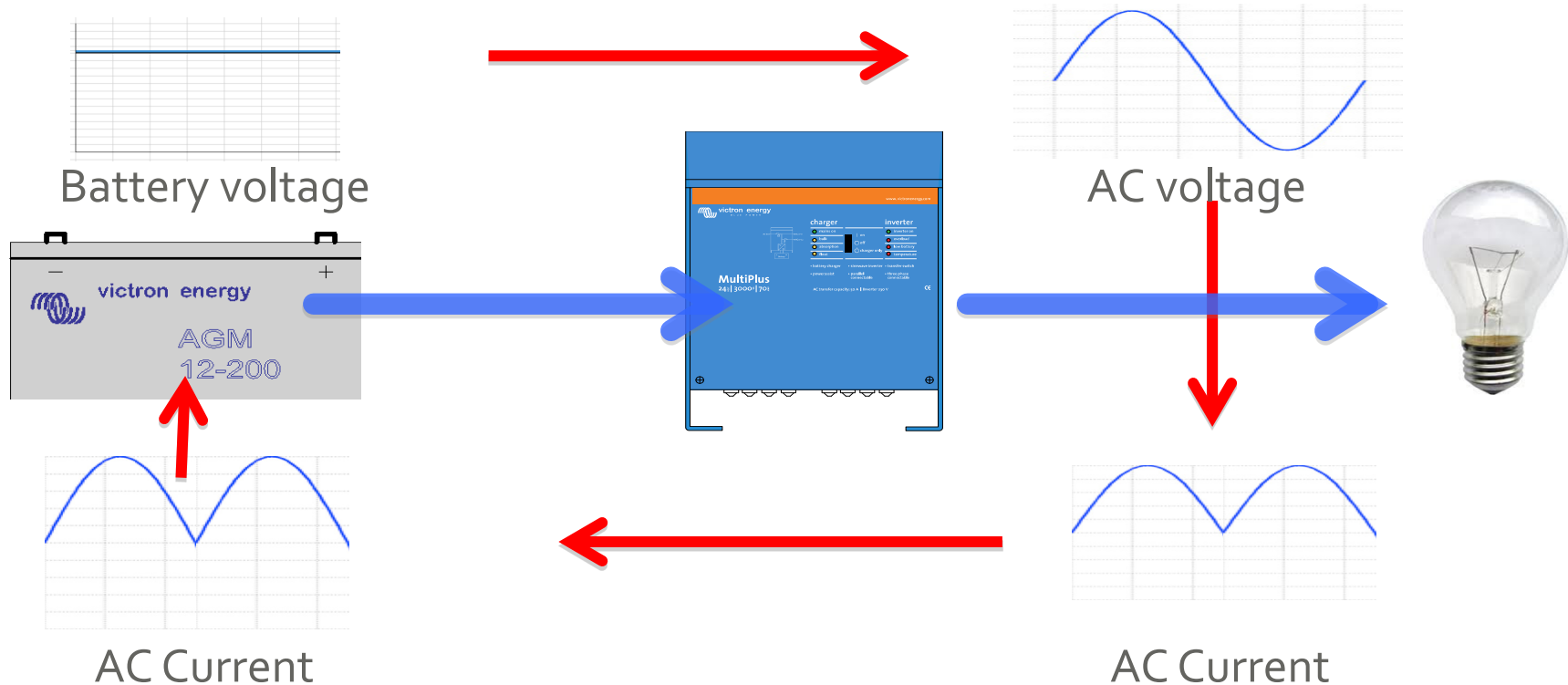
Victron Energy

Ripple, where does it come from ?



Ripple appears in a system where the power source is a battery

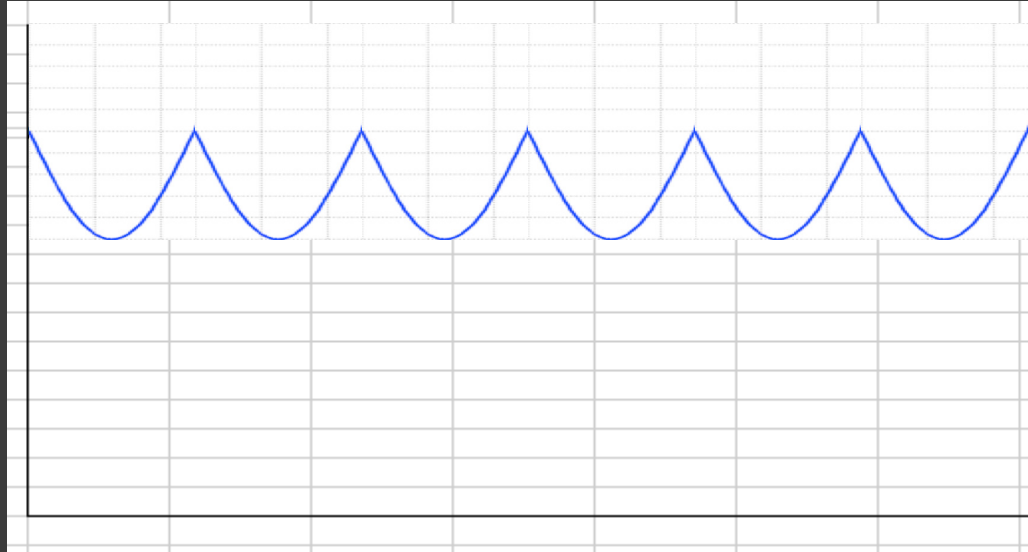
Ripple, where does it come from?



An AC current peak on the battery will make the voltage drop

Ripple, where does it come from ?

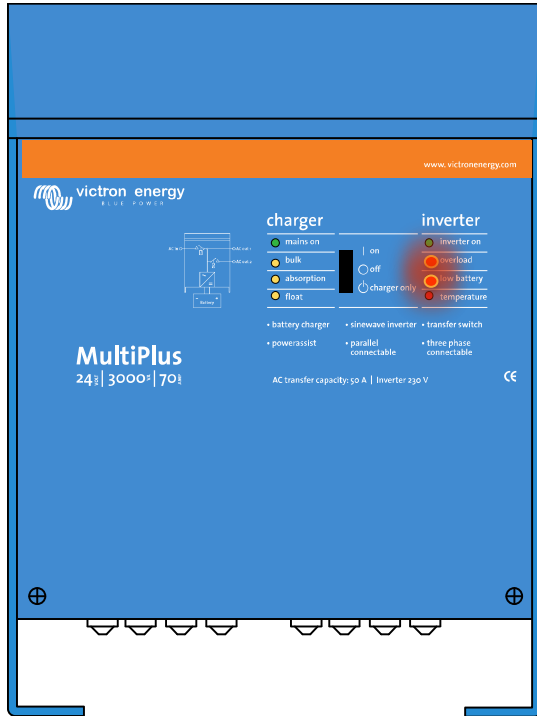
Battery
voltage



Ripple

Because the battery drops in voltage when there is a load a ripple will appear

Ripple LED indication



An perfectly wired installation will under full load give a ripple of +/- 0,6 to 0,8 volt.

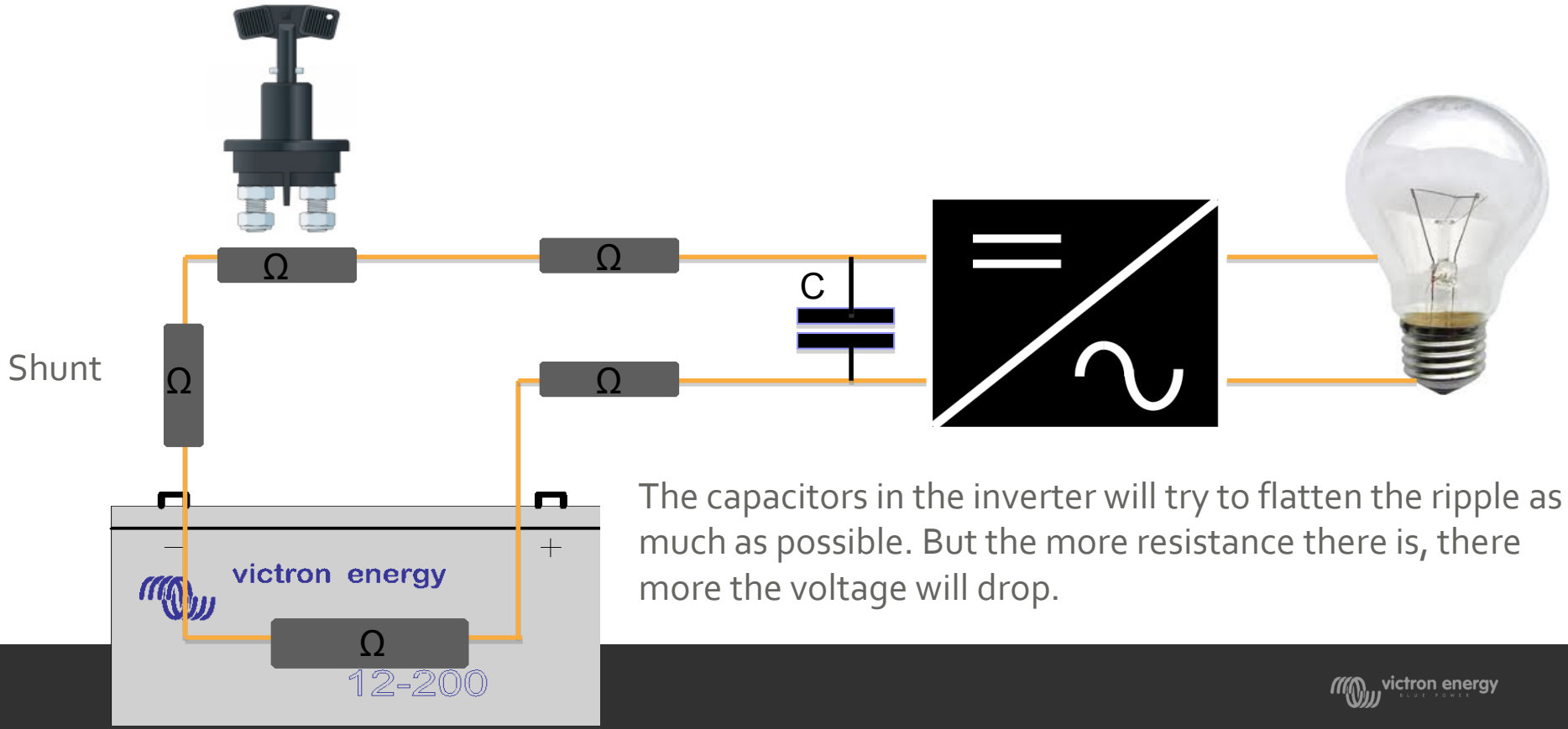
LED indications:

Overload and low battery together

flash > 1,2V ripple

lit up > 1,5 V ripple (unit locked out)

Low resistance in DC system results in low ripple

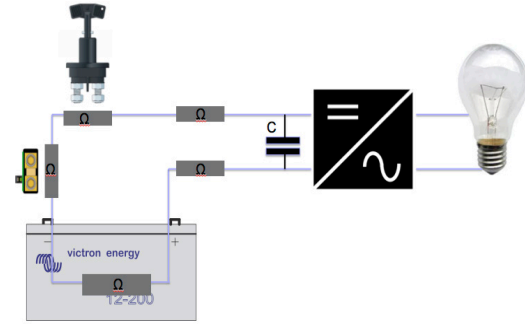


Results of ripple

- Due to large currents in the capacitors the lifetime of inverters decreases
- Due to the discharge/charge effect the battery lifetime is limited
- Due to ripple during charging the charge power is reduced.
- Due to the ripple also other connected loads will suffer from the same ripple

Tips:

- 1) The height of the ripple can be seen in VEConfigure
- 2) DC Ripple can also be measured by having the multi meter on the ac range but measure on the DC system



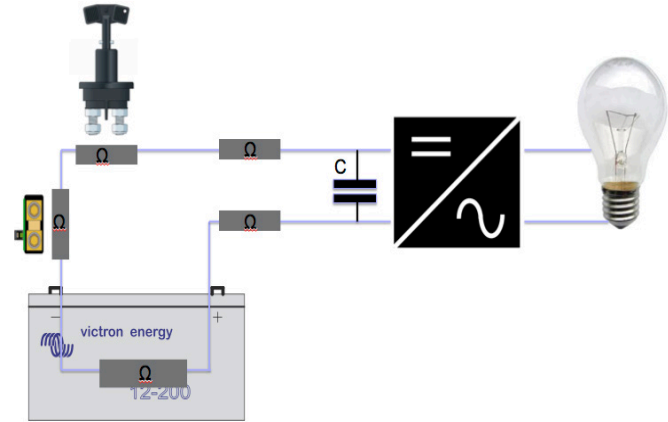
Low resistance in DC system results in low ripple

Make sure resistance in the DC system is LOW

In practice:

- The capacity of the battery bank must be high enough
- Use as little cable length as possible
- Use the correct size (*)
- Use quality main switches
- Avoid too much fuses
- Avoid more than one shunt in a system

(*) Rule of thumb ; $\text{Amps}/3 = \text{size mm}^2$ up to 5 metre (every 5 mtr one step size up)





Energy. Anytime. Anywhere.