

Figure 19.33 Step-down/step-up converter during “off” state

19.2.4.3.4 Combination of a step-down converter with an inverter

The combination of a step-down converter with a voltage inversion is shown in Figure 19.34. It should be noted that in this configuration the voltage of the DC input sources must always be equal to or bigger than the AC peak voltage.

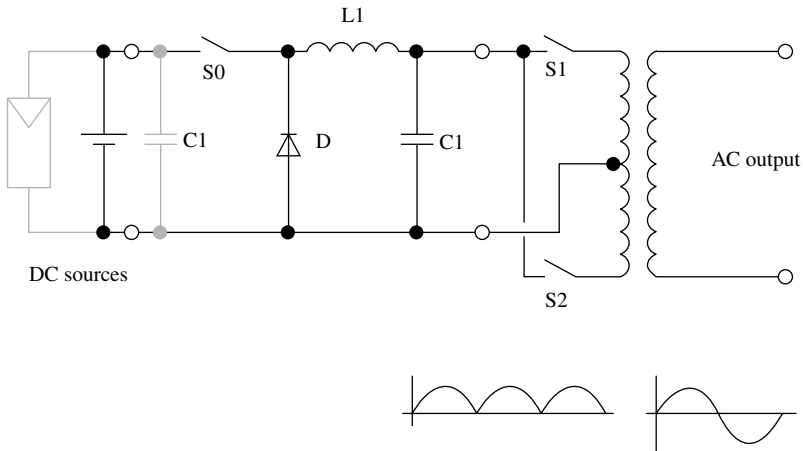


Figure 19.34 The combination of a step-down converter with inverters allows to produce sine-shaped AC output voltage. Wave shapes correspond to the voltage at the terminals over them

19.2.4.3.5 Voltage shaping by digital synthesis

In a further concept, the step-down converter can be replaced by digital synthesis as shown in Figure 19.34. In this concept, the desired voltage is obtained by binary addition of individual voltage sources [5–7]. Depending on the sum of these sources, the sine-shape can be approximated.

When using 5 sources, 32 voltage steps according to 2^5 adjustable levels can be obtained as shown in Figure 19.35. The resulting total harmonic distortion (THD)¹ can be kept well below 5%.

¹ Definition of THD: sum of the amplitudes of all harmonic frequencies compared to the amplitude of the fundamental signal (the 50- or 60-Hz frequency).