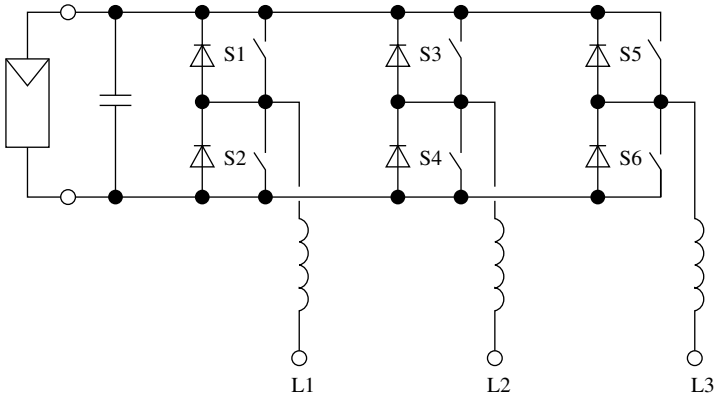


**Figure 19.39** Three-phase PWM inverter

### *19.2.4.3.8 Three-phase configuration*

The configuration shown in Figure 19.36 is also very well suited to be expanded into a three-phase version as given in Figure 19.39 [4].

This type of inverter is normally suited to a power range above 5 kW. Connection efforts at the AC side are somewhat higher since three terminals have to be dealt with. The most striking advantage of a three-phase concept can be seen in the fact that the power output and, thus, the power input are absolutely constant. As a consequence, no storage capacitor at the DC input side is needed.

This concept can also be combined with a three-phase transformer in a way as has been described earlier.

This inverter type is most commonly used in PV pumping systems. In contrast to most other applications, PV pump inverters operate with variable frequency and voltage at the AC output side. As an example, a typical characteristic of a centrifugal pump system is given in Figure 19.40.

The figure shows the pump head as a function of mass flow. The parameters are pump speed equivalent to the frequency and system efficiency.

Since the sinusoidal shape is obtained by a step-down process, as was described earlier, lowering of the AC voltage can be easily performed by the same configuration. In addition, MPP tracking can easily be performed by adjusting the frequency and proportionally the AC voltage in such a way that the PV generator can provide maximum power. In Figure 19.41, a typical PV pump system configuration is shown.

### *19.2.4.3.9 High-frequency concepts*

If electric isolation between DC input and AC output is requested and if the bulky 50-Hz transformer should be avoided, high-frequency (HF) transformer concepts may be used. Three topologies using HF concepts will be described in this section.

In the first concept, the configuration as described in Figure 19.34 is used to operate with a high frequency (some 100 kHz) using an HF transformer. The HF square-wave