

POWER REGULATION FOR HEATING APPLIANCES

Currently, there are six different technologies available on the market for regulating the output of heating appliances.

1 Unregulated switching devices:

These typically only switch the controllable resistive load on or off. A fully regulated **surplus management is virtually impossible**. So-called SG-Ready heat pumps, controlled by inverters, usually behave in a similar manner (with the exception of inverter heat pumps within certain limits).

2 Step-changer switching devices:

These devices switch heat sources in steps, typically in increments of 500 to 1,000 watts, and provide much better control compared to (1). The average control error is half the step power, which means a 250-watt control error for a 500-watt step. This results in an energy loss of 875 kWh over 3,500 operating hours. With an energy price difference of 35 cents per kilowatt-hour, this translates to an **additional cost of 300 euros per year** compared to continuously regulated systems.

3 Thyristor Controllers:

These operate with a so-called phase-fired control, similar to what is used in low-power light dimmers. According to the technical connection requirements of Austrian and German grid operators, heat sources regulated by phase-cut control can only be connected up to 200 watts without approval. This limitation is due to network feedback and interference with other consumers. Additionally, **the installer is responsible for ensuring compliance with all electromagnetic compatibility (EMC) standards**. EMC compliance can only be verified through on-site measurements (as is customary with individual system approvals), as thyristor controllers are components and not certified finished devices. Typically, without additional filtering measures, these standards are far from being met.

4 Pulse packet controls:

These controllers regulate power by releasing half or full wave packets. Due to non-compliance with the allowed switching frequencies in the grid connection conditions of Austrian and German grid operators, they cause flickering of lighting fixtures.

5 HF-clocked power controller with HF output:

These power regulators can be described as true "high-frequency transmitters." At their output, they deliver unfiltered high-frequency voltages of up to 300 volts peak ("**electrosmog**"). Such devices do not comply with radiation limit values. The distributing party is responsible for ensuring compliance with these limits. High-Frequency Controlled Power Regulators with HF Output:

6 HF-clocked power controllers with 50 Hz sinusoidal output and HF-clocked compact devices:

These power controllers operate at a high frequency with pulse-width modulation, feature sophisticated input and output filters, and **comply** with the current **regulations concerning EMC, TAB, and TAEV** in terms of both network feedback and HF-emissions.

PV products exclusively belong to category (6). We prioritize quality, and we encourage you to do the same!