Combustion air fans of conventional firing plants constantly run at full speed – even in the low-load range. This generates noise and also consumes electrical power unnecessarily. When firing plants are operated at partial or low load, speed control can bring your strengths into play: it reduces the speed of the combustion air fan when the burner does not need the full airflow. This saves precious energy that otherwise has to be absorbed at the air dampers.

**Advantages of a Speed Control at a glance**

- Applicable with all burner types and heat generators
- Easy to retrofit
- Minimized power consumption: savings of up to 80 % compared to systems without control
- Considerably lower running and operating noise
- Less mechanical stress on fan and burner components
- Better control performance, especially in low-load range
- High degree of availability, long service life

**Optimum efficiency in a broad performance range**

Regardless of their design, fans with a constant speed have to be designed in such a way that they generate enough air pressure for full load operation of the firing system. As a result, the fan always runs at top speed to meet this requirement even though merely a “light breeze” would be necessary at lower firing rates. The excess pressure is reduced by means of the control dampers of the burner. It is obvious what that means. The fan operates uneconomically if the full air flow is not needed.

A speed control system ensures that the fan builds up exactly the pressure required by the combustion process at every firing rate. It therefore does not run permanently at full steam, but only as fast as necessary. That means: the efficient operating range is extended significantly and considerably less power is consumed. An extremely practical aspect is that, in principle, speed control systems can be retrofitted to any fan. The design and size of the fan do not matter.
Significantly reduced noise level

Excessive noise especially in low-load operation is eliminated with speed control: the latter minimizes the noise emissions of the air damper and fan.
In practice the sound pressure level can be reduced in this way by up to 15 dB(A) compared to damper control – and ensures substantial noise relief in the boiler room.

Compact technology

To change the speed of commercial three-phase motors it is necessary to change the frequency fed to the motor. For this purpose frequency converters are connected between the mains and the motor whose speed is to be varied. The fan speed appropriate for the fuel and air volume is specified depending on the load via the electronic compound regulator. The actual speed is measured on the fan shaft and this signal is transformed and then sent back to the compound regulator. The compound regulator compares the actual to the target value of the fan speed and thus represents a safety-oriented monitoring device.
The speed changes due to the change in frequency, nearly inertia-less and hysteresis-free, so that an optimal fuel-air ratio and thus flaw-less combustion can be guaranteed even with rapid load changes.

Example of a plant

The following example illustrates the cost savings in the case of a firing plant with a typical 10 MW gas burner. The power costs drop significantly giving an amortization period of less than two years.
The significantly reduced noise level in the boiler room is not recorded.

Example calculation for payback with a typical 10 MW gas burner and speed control

<table>
<thead>
<tr>
<th>Burner output MW</th>
<th>Operating hours h/a</th>
<th>Saving Energy kWh/a</th>
<th>Costs EUR/a</th>
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</thead>
<tbody>
<tr>
<td>9.0</td>
<td>500</td>
<td>3.850</td>
<td>2.738</td>
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<tr>
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<td>11.000</td>
<td>3.601</td>
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<td>5.4</td>
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<tr>
<td>Amount</td>
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</tbody>
</table>

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