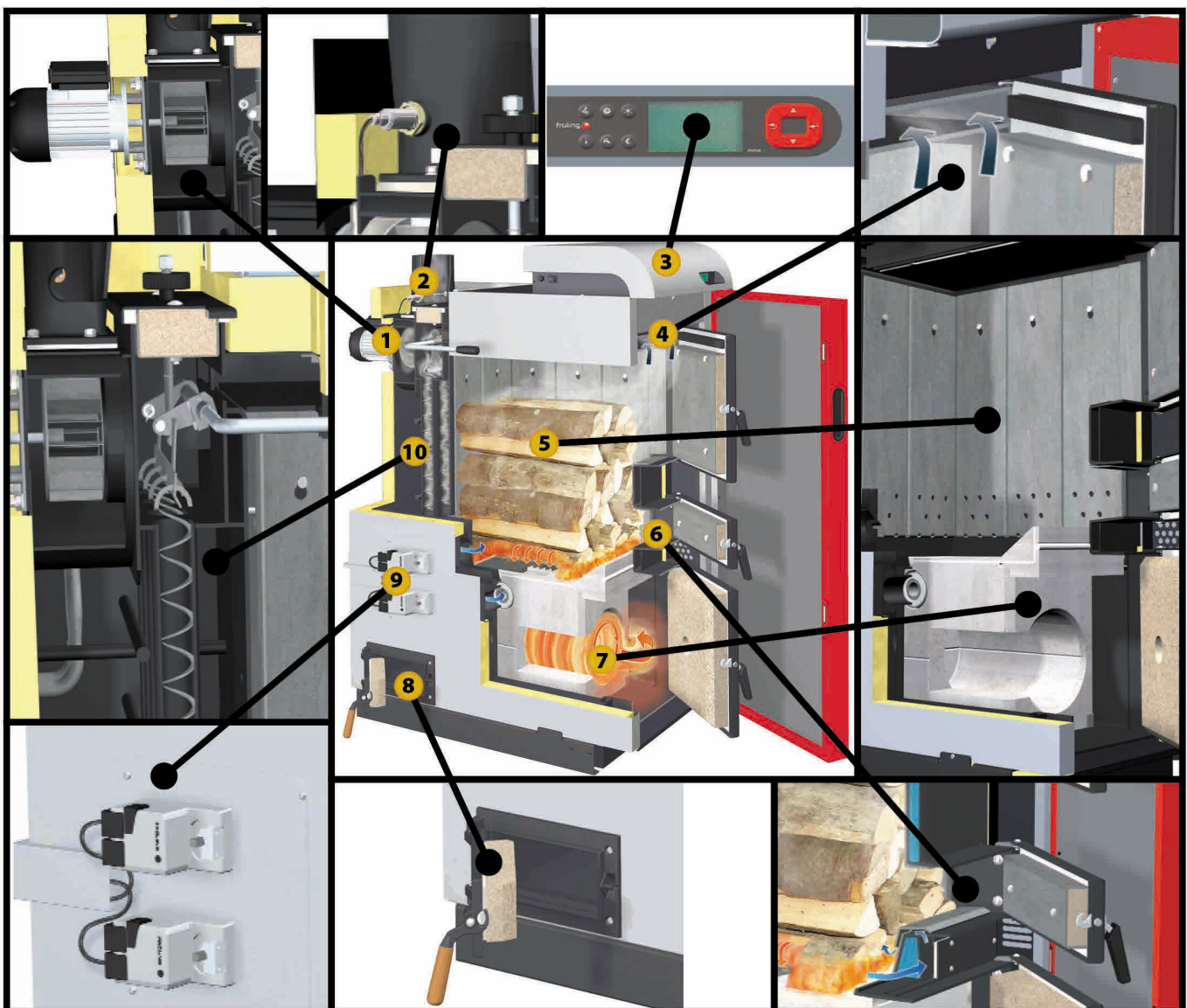


Lambda Controlled Wood Boilers

Lambda controlled combustion in wood burning boilers combines modern computer processing and control with the ancient use of wood as fuel.

The problem: A traditional problem with wood burning is the emission of unburned, yet energy rich gasses as smoke. Burning smoke enhances efficiency and decreases harmful emissions. If wood is heated and turned into charcoal without active flame, about 1/2 of the energy content in the wood will be released as smoke. The combustion of wood involves three phases- drying (evaporation of water), smoke production, and charcoal. All three phases are taking place to some degree simultaneously, however the bulk of a load of wood in a combustion chamber will generally be in one phase or another depending upon how long the wood has been exposed to high temperatures/fire. Combustion of wood smoke is only achieved at very high temperature and with proper combustion air mixing. Because wood is changing phases as it is heated/burned and because wood is an irregular fuel by shape, species, moisture content, age, etc. regulation of combustion air in order to optimize combustion and to minimize emissions of smoke is very difficult to maintain manually.

The solution: Wood gasification boilers typically burn wood in an upper (primary) combustion/wood storage area. This combustion zone is relatively low in temperature and is quite large. The primary combustion chamber is generally supplied by air at the base of the base of the primary combustion chamber. Below the primary combustion chamber there is a secondary combustion zone generally consisting of a ceramic refractory chamber with injected combustion air. The secondary chamber is designed for high turbulence, high temperature and high residence time of the combustible gasses. A lambda control system automatically adjusts primary and secondary combustion air through independent air controls, optimizing combustion as the wood burns. The lambda control system monitors excess oxygen and the temperature of the exhaust, feeds this information to the processor, and adjusts air damper servo motors appropriately. Combustion air is adjusted to automatically match the composition of the wood fuel at any stage of combustion, and for any variation in the wood fuel. Harmful emissions are reduced and efficiency increases.



- | | |
|---|---|
| 1 Speed Regulated Draft Fan | 6 High Temperature Swirl Combustion Chamber |
| 2 Oxygen Sensor | 7 Ignition Port for Easy Starting |
| 3 Lambda Control with Continuous Monitoring | 8 Rear Cleanout for easy Cleaning |
| 4 Smoke Extraction Passage | 9 Motorized Air Dampers |
| 5 Generous Firebox Size | 10 External Heat Exchange Cleaning |