

Uical

AIREX 2S

WOOD PYROLYSIS
SUCKING FAN



To optimize green energy



AIREX 2S constitutes the evolution of the firewood boilers range:

- *total gasification*
- *inverted flame*
- *with sucking fan*

especially suitable to the consumers that, having “poor” fuel, as the firewood, intend to exploit its precious calorific power.

The high-efficiency is reached through the accurate control of the combustion air, performed through two regulation systems on the primary and secondary air, that allow to dose perfectly the fuel mixture.

The air injection is supervised by *ventilation system*, placed *downstream* the combustion chamber, that puts in negative pressure the whole system.

The further advantages that derive from it are:

- *reduction of the lighting time;*
- *elimination of refluxes of smokes when opening the loading door;*
- *reduction of the noisiness.*

AIREX 2S MODUL

When modulation means saving

“Modulated” Power or, to supply power and, therefore, heat, only according to the real requests of the consumer.

Once the ideal temperature of the room has been selected, the boiler, automatically, modulates the flame and, therefore, optimizes the fuel consumption to satisfy the request in the shortest possible time, thus reducing costs and wastes. The more the requested room temperature will be higher than the effective temperature, the more the boiler will be called to supply heat at the maximum output.

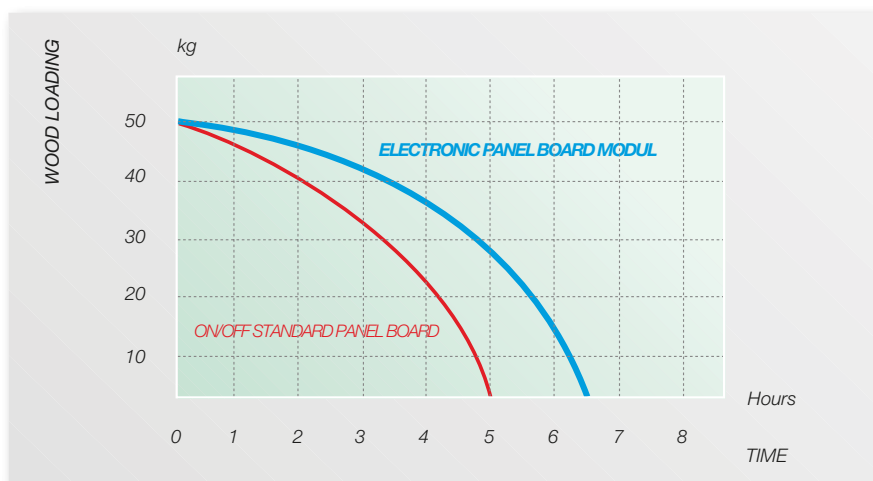
Vice versa, once reached the requested temperature, only the alive embers will be maintained in boiler, always ready to begin again at every increase request, coming from the room thermostat.

The modulating system of the boiler panel board, allows to save **up to 30%** of firewood in comparison to the standard panel board. In combination with a room chronothermostat, in case of extinction and re-ignition, the supplied power will be first progressively decreased and, subsequently, proportionally increased, according to the real measured temperature differences, eliminating so the thermal inertia (heat excess at the extinction and delay in the re-ignition), typical of the On-Off systems.

All of this means:

- **fuel saving;**
- **longer duration of the firewood loading;**
- **reduction of the daily number of restocking;**
- **guaranteed heat.**

OPTIMIZATION OF THE SAVINGS THANKS TO THE ELECTRONIC PANEL BOARD MODUL



The intelligent modulation

The modulating panel board is endowed with:

- *microprocessor for the management of the modulating fan*
- *flow temperature sensor*
- *return temperature sensor (to be used in installations with heat accumulator).*

Operation

Once adjusted the maximum boiler temperature, the flow temperature sensor, during the raising phase, compares it with the measured one and calculates the difference between them. When the measured temperature is 5 K before reaching the adjusted one, the speed modulation reduces progressively the revolutions of the fan (that supplies the necessary air for the combustion) up to the attainment of the temperature selected by the consumer.

If the boiler temperature exceeds the one selected, the fan speed progressively decreases up to the turning off of the fan.

This way of operation allows a better control and reduction:

- *of the supply of necessary oxygen for the combustion*
- *of the quantity of firewood to be burnt*
- *of the quantity of produced thermal energy.*

In case of increase of the heat request, the fan revolutions number will progressively be increased.

It is evident the difference of operation in comparison to the one of the standard panel board, where the flame is totally free to develop according to the available firewood, without considering the actual heat request.

AIREX 2S

BICOMB MODUL



The assurance of the comfort

To be able to use an autonomous auxiliary boiler when, for any reason, the stock of firewood is exhausted, is the solution offered by the “BICOMB MODUL” version. The consumer has at his disposal, completely integrated in the upper part of the wood fired boiler, *a second, dry combustion chamber, boiler*, that can work both, on oil or gas.

The simple installation of AIREX 2S BICOMB MODUL allows therefore to have a true “boiler house” not cumbersome but, at the same time, of great efficiency.

To underline the *complete automatism*, controlled by a special panel board that automatically activates the auxiliary boiler when the firewood is exhausted, avoiding so undesirable surprises getting back home.

In synthesis::

- *2 boilers:*
 - a wood fired boiler
 - an oil or gas fired boiler (placed on top of the wood fired one);
- *small encumbrances;*
- *high power;*
- *completely automatic management;*
- *lighting of the oil / gas boiler only when firewood is exhausted;*
- *simple and fast installation.*

Tradition and innovation

Commands and controls *The modulation logic*

A simple regulation of the quantity of necessary heat is furnished by the **electro-mechanical panel** board that manages:

- *automatically the sucking fan*
- *the working thermostat*
- *the lighting of the oil / gas fired boiler, guaranteeing:*
- *combustion control*
- *reduction of firewood consumptions*
- *operation safety*

But the alternative that allows a true qualitative jump in the AIREX 2S operation is the **modulating panel board** that integrates the a.m. functions, with a refined system of temperature control, guaranteeing:

- *maximum savings of the firewood;*
- *exceptional thermal balancing of the boiler;*
- *elimination of condensate phenomena.*

■ *The electronic system of the panel board, in synthesis checks the difference between the boiler flow temperature and the boiler return temperature and, consequently, the lighting, the extinction and the fan speed modulation, comparing them with the temperature programmed by the consumer through the working thermostat.*

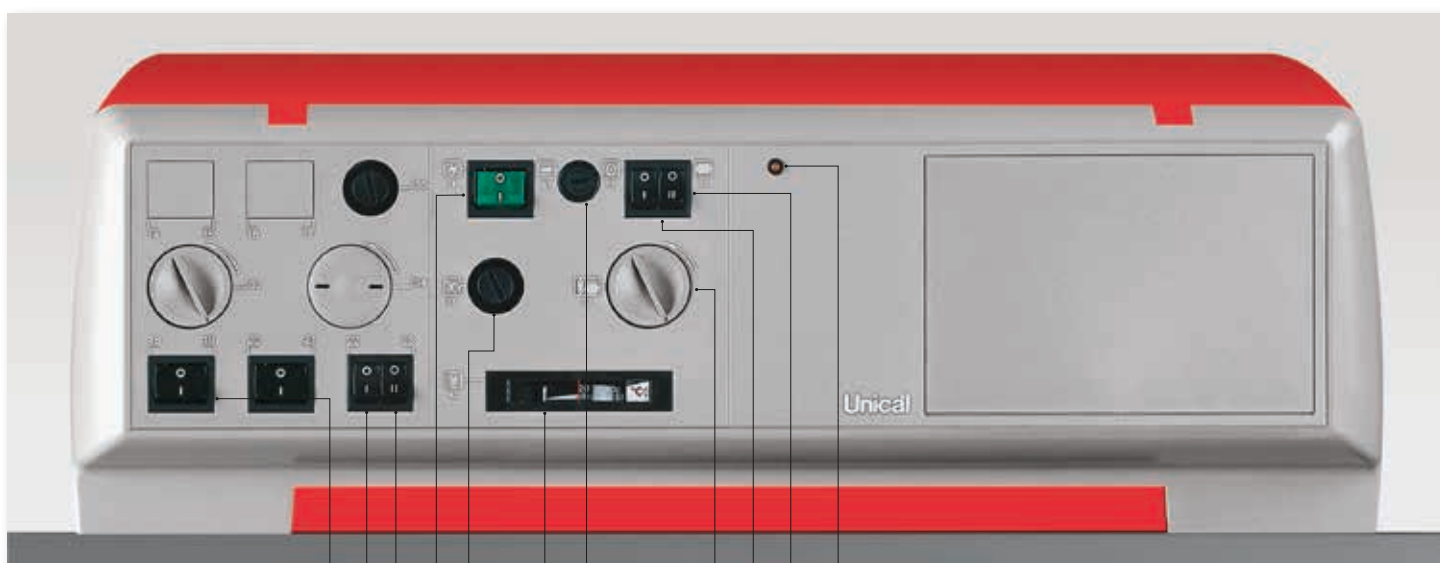
■ *The diminution of the fan regime has the objective to reduce the instant power of the boiler, between 50 and 100% of the nominal power, in proximity of the temperature programmed by the consumer, allowing the attainment of the power required by the heating installation. The accuracy of the performed measures is about of one Celsius.*

■ *If the detected temperature is 6 K below the set point on the boiler thermostat, the control logic automatically sets the fan speed to the maximum.*

■ *If the boiler temperature exceeds of 1 K the set point of the thermostat, the control logic automatically sets the fan speed to the minimum.*

■ *We have the modulation of the fan speed when the difference between the detected temperature and the set point temperature is between 1 and 5K*

■ *The turning off of the fan occurs, instead, if the flow detected temperature is 4 K higher than the set point temperature.*



Fan check button *

Change-over switch between wood & oil/gas operation *

Burner switch*

Main switch with pilot lamp

Safety thermostat

Alarm lamp for fan overheating

C.H. pump switch

Fan switch

Working thermostat

General fuse

Boiler thermometer

* referred to the model AIREX 2S BICOMB MODUL

High-efficiencies guaranteed long lasting

The pyrolytic combustion

The particularity of AIREX 2S consist of developing the **"inverted flame"**, or rather to reverse the traditional way of the combustion that, instead of going upwards, goes downwards. With the aid of the sucking fan, placed in the rear part of the boiler, in fact, the firewood normally lighted, placed in the wood store above a special grate (burner), develops a particular form of combustion that, thanks to the elevated temperature, determined with the balanced supply of the primary combustive air, from the top and

secondary one, injected through the separation grate, transforms the cellulose in simpler compounds that burn in the underlying combustion chamber with a flame entirely similar to that of the natural gas, with an efficiency higher than 85%.

Prevention of the corrosions

A fuel rich in damp as the firewood doesn't have to attack the metallic parts of the boilers. The construction of the AIREX 2S series uses high thickness, 8 mm, carbon steel, that, together with special, slow opening **thermostatic valves** (Patent MN930011), eliminate the acidic condensates, maintaining high and constant the return temperature around the firewood store.

The thermostatic valves are placed on the C.H. flow collector and they intercept the circuit until the boiler, in the phase of first heating, has not stabilized its temperature around the 70°C, or rather out of the band of smokes condensation.

It derives of it:

- reduction of the soot phenomena of the smokes circuit;
- maximum cleaning of the combustion chamber;
- reduction of the thermal shocks between boiler and C.H. circuit.

The introduction of the new **catalyst in special strengthened refractory concrete**:

- annuls the acidic condensates in the lower parts of the boiler;
- increases the efficiency raising the combustion temperature and "burning" the heaviest particles;
- reduces the dust emissions.

Warning to the heat losse

The insulation of the boiler is obtained with a 60 mm rock wool mattress that wraps completely the boiler body.

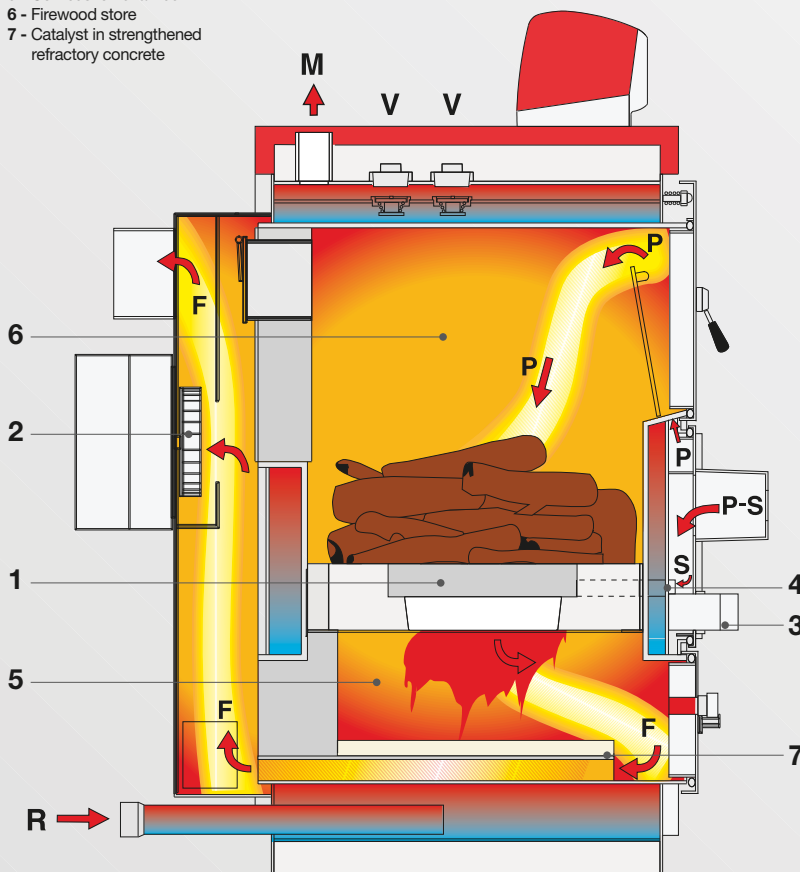


Thermostatic valves **Unical Patent**

SMOKES CIRCUIT

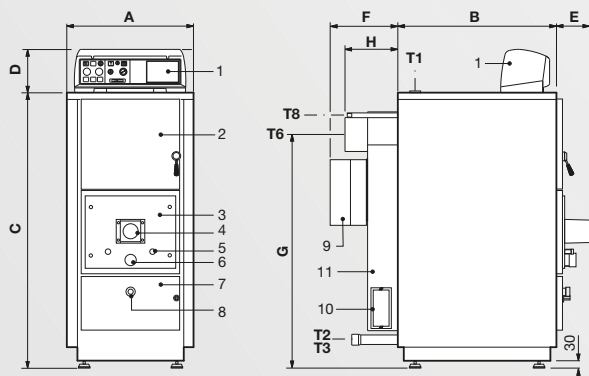
- 1 - Burner in refractory stone, with cast iron fire bars and stainless steel grate
- 2 - Fan with acoustic protection
- 3 - Primary air adjustment
- 4 - Secondary air adjustment
- 5 - Combustion chamber
- 6 - Firewood store
- 7 - Catalyst in strengthened refractory concrete

- M - C.H. flow
- V - Thermostatic Valves
- P - Primary Air
- S - Secondary Air
- F - Smokes
- R - C.H. return

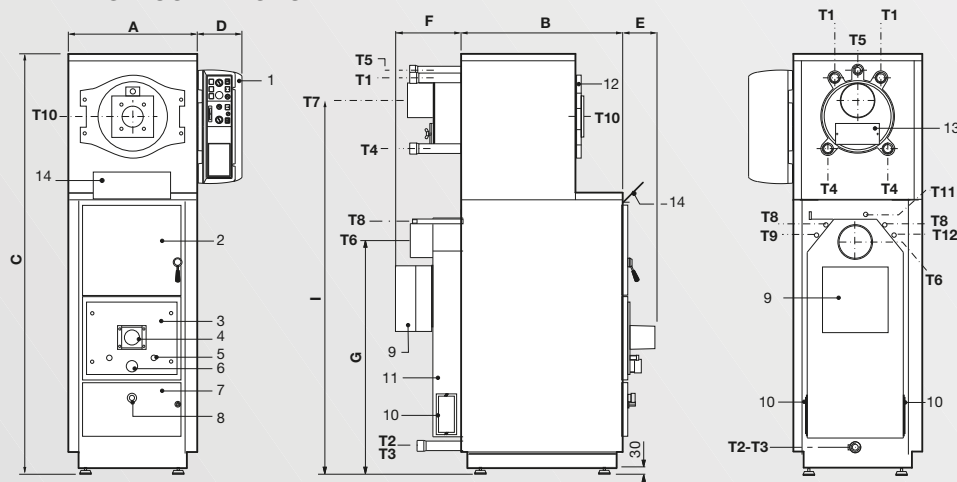


Dimensions and technical data

AIREX 2S - AIREX 2S MODUL



AIREX 2S BICOMB MODUL



Key:

- 1 - Panel board
- 2 - Door of firewood store
- 3 - Central door
- 4 - Inlet of primary / secondary air
- 5 - Adjusters of secondary air
- 6 - Adjuster of primary air
- 7 - Combustion chamber door
- 8 - Flame sight glass
- 9 - Fan
- 10 - Cleaning doors
- 11 - Rear smoke chamber
- 12 - Auxiliary boiler door
- 13 - Smoke chamber cleaning door
- 14 - Burner protection
- T1 - Central heating flow
- T2 - Main central heating return
- T3 - Boiler drain
- T4 - Secondary C.H. return
- T5 - Air venting & expansion vessel connexion
- T6 - Chimney connection of wood fired boiler
- T7 - Chimney connection of auxiliary boiler
- T8 - Safety heat exchanger connections
- T9 - Bulb holder connection for probes
- T10 - Auxiliary boiler burner connection
- T11 - Bulb holder for working, max., min. thermostats and thermometer
- T12 - Bulb holder for safety thermostat

AIREX 2S	A	B	C	D	E	F	G	H	I	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
model	mm	mm	mm	mm	mm	mm	mm	mm	mm	Rp	Rp	Rp	Rp	Rp	Ø mm	Rp	R	Rp	Rp	Rp	Rp
25 / 25 MODUL	560	700	1225	190	160	315	1030	245	-	1 ¹ / ₄	1 ¹ / ₄	1 ¹ / ₂	-	-	150	-	1 ¹ / ₂	1 ¹ / ₂	-	1 ¹ / ₂	1 ¹ / ₂
40 / 40 MODUL	655	700	1355	190	160	315	1140	245	-	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₂	-	-	200	-	1 ¹ / ₂	1 ¹ / ₂	-	1 ¹ / ₂	1 ¹ / ₂
50 / 50 MODUL	655	900	1355	190	160	315	1140	245	-	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₂	-	-	200	-	1 ¹ / ₂	1 ¹ / ₂	-	1 ¹ / ₂	1 ¹ / ₂
65 / 65 MODUL	755	955	1405	190	160	315	1180	245	-	2	2	1 ¹ / ₂	-	-	220	-	3 ³ / ₄	1 ¹ / ₂	-	1 ¹ / ₂	1 ¹ / ₂
80 / 80 MODUL	755	1255	1405	190	160	315	1180	245	-	2	2	1 ¹ / ₂	-	-	220	-	3 ³ / ₄	1 ¹ / ₂	-	1 ¹ / ₂	1 ¹ / ₂
25 BICOMB MODUL	560	700	1775	190	160	315	1030	-	1575	1 ¹ / ₄	1 ¹ / ₄	1 ¹ / ₂	1 ¹ / ₄	1	150	150	1 ¹ / ₂	1 ¹ / ₂	110	1 ¹ / ₂	1 ¹ / ₂
40 BICOMB MODUL	655	700	1955	190	160	315	1140	-	1720	1 ¹ / ₄	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₄	1	200	150	1 ¹ / ₂	1 ¹ / ₂	110	1 ¹ / ₂	1 ¹ / ₂
50 BICOMB MODUL	655	900	2005	190	160	315	1140	-	1775	1 ¹ / ₄	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₄	1	200	150	1 ¹ / ₂	1 ¹ / ₂	110	1 ¹ / ₂	1 ¹ / ₂

AIREX 2S	Min. Output for wood operation	Nominal Output for wood operation*	Max. Input for wood operation	Nominal Output for oil/gas operation	Nominal Input for oil/gas operation	Boiler water content	Pressure drop water side**	Pressure drop smoke side for wood operation	Pressure drop smoke side for oil/gas operation	Boiler Max working pressure	Wood log store volume	Wood loading opening	Wood logs lenght	Weight
model	kW	kW	kW	kW	kW	l	m w.c.	mm w.c.	mm w.c.	bar	l	mm	cm	kg
25 / 25 MODUL	15	29	34.9	-	-	90	0.10	0.3	-	3	95	290 x 340	50	396
40 / 40 MODUL	23	47	55.3	-	-	110	0.08	0.4	-	3	135	350 x 440	50	485
50 / 50 MODUL	29	58	68.6	-	-	140	0.12	0.6	-	3	185	350 x 440	70	603
65 / 65 MODUL	41	65	78.2	-	-	170	0.06	0.3	-	3	235	340 x 520	70	760
80 / 80 MODUL	52	80	96	-	-	220	0.10	0.5	-	3	325	340 x 520	100	927
25 BICOMB MODUL	15	29	34.9	26	28	120	0.19	0.3	1.6	3	95	290 x 340	50	470
40 BICOMB MODUL	23	47	55.3	35	38	155	0.20	0.4	2.0	3	135	350 x 440	50	570
50 BICOMB MODUL	29	58	68.6	52	57	195	0.27	0.6	2.2	3	185	350 x 440	70	730

(*) Output obtained with good quality wood, containing a humidity of 15%. (**) Pressure losses with a water flow rate corresponding to a Δt of 15K.

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