Rotating Rack Ovens
ROTOR and ROLLER

The model of the picture is ROTOR 68.

The model of the picture is ROLLER 68.

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Rotating Rack Ovens

Description

Rotor and Roller are rotating rack ovens. They are convection ovens with forced air circulation.
Rotor is a rear oven with back burner and heat exchanger, to reduce overall dimensions.
Roller has a frontal burner and heat exchanger, to satisfy specific operating and positioning requirements. This permits to set into line more units, side by side.
Made in stainless steel, the oven is suitable for the baking of different kinds of bread and pastry products, both of small or medium size.
The balanced inflow of hot air, combined with the rotation of the rack and a controlled steam input, grants constant, even baking, enhancing the rising and fragrance of the product. Perfectly stable baking grants to obtain voluminous and soft bread, of any shape and kind.

The air is channelled into the baking chamber trough special ducts and a series of inlets with adjustable shutters, realising the heat absorbed from the heat exchanger. The air is heated in a proper heatexchanger provided with a heat resistant surface that allows a big thermical exchange.
Advanced technology, quality materials and high thermic efficiency ensure even baking and low consumption. The modular construction system reduces installation time and offers increased protection against the structural expansion that occurs during the operation. The special structure and the combination of the components minimise heat loss and optimise energy consumption. The result: maximum fuel savings for a more economic plant. The oven has a perfect thermic isolation, no toxic materials are employed.

The powerful steam device, inside the baking chamber, operates through a programmable timer system, provides the adequate quantity of steam for even the most demanding applications.
The oven can work with gas or diesel burners, as well as by electric energy.
It is available in two versions: with mechanical or digital panel.
The machine complies with the latest CE regulations.

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Rotating Rack Ovens **Composition**

1 – Structure

The oven is made of **stainless steel** AISI 430, with thickness of mm 1; 2, 3, 4, or 5 depending on the parts.
The different thickness, the particular folding system and the special combination of its parts optimise the functioning and cut down the loss of heat.
The façade is of stainless steel of mm 1,5.
The heat exchanger is of AISI 310, **high temperature steel**, with thickness of mm. 2.
The steam generators are made of iron (Fe).
The standard outside covering is made of painted galvanized sheet iron.
All the parts are **fixed with screws**. By the thermic dilatation, this system is more reliable and allows durability and longevity.

2 – Heatexchanger

This is the part of the oven that allows to the combustion gas to heat the air that gets in touch with the baking product. It is situated in the back part of the oven (ROTOR back side burner) or in the lateral part (ROLLER front side burner).
It is built in **heat resistant stainless** steel AISI 310 and steel pipes in considerable number (30 pipes) in order to increase the surface of thermical exchange.
The combustion gases accomplish a long path inside the exchanger – **4 turns** - until the chimney exit. The path of the air is due to a ventilator that is situated on the exchanger and that send the air into the baking chamber.

3 – Steam device

It produces the required steam and introduces it in the baking chamber.
It consists of "U" iron elements, overposed and canted alternatively to the left and right, so that the water, introduced in several points by means of pipes, flows downward.
These elements are heated at high temperature, producing therefore the water vaporization.
Under the iron elements there is a small basin to collect and expel the exceeding water.
The vaporizer is placed into the baking chamber, near the heatexchanger and behind its protection panel.
The steam generator has a very important mass, for example in the model 68 (60x80) there **are 4 modules with a total weight of 198 kg**.
The results are: a perfect distribution of steam throughout the baking chamber, instant and plenty of saturated steam which coats the bread, shiny and well developed bread, non stop baking even with short cycles and high stream injections without any problem.

4 – The air circulation

The impeller allows the circulation of the hot air in the oven; it is installed above the heat exchanger with the suction point mounted on a collector connecting it to the baking chamber. It is a centrifugal type ventilator with the motor directly connected to the impeller shaft. The ventilator – r.p.m 1400 – capacity m3/min 35-40, has a

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power of kw 1.1 for model 57. kw 1.5 for model 68 and kw 2.2 for all the others. It is possible to have the speed variator as optional.
The **same colour** on all types of product all over (on the trays and on the different floors of the rack), an **even thickness** of the crust thanks to the **efficiency** of the heat exchanger (4 turns), the particular construction system of the baking chamber (the proportion on the volume, the different thickness and combination on the materials and their particular folding system), the **slow ventilation speed** and a perfectly **controlled** air flow (adjustable blowing slots fitted with air flow direction guides)

5 – Steam extractor

It is an extractor installed above the extractor hood that operates by opening the door during the operation of oven's unloading.
The ventilator (model type ECB230) has a power of kw 0,37 – r.p.m 1400, 8-10 m3/min.

6 – Rotary tool drive

These mechanisms generate the rotation of the trolley inside the baking chamber. It consists of two worm gear reducers coupled by means of a connecting bell that allows a high reduction rate. The reducers kinematics consists of an endless screw and a rim.
The total transmission rate is 400:1, one speed, with kw 0.09 for model 57 and 0.18 kw for all the others. The gear motor is provided with a controlled safety friction clutch so that by low couple there is the immediate.
The Rack suspension system or turntable suitable for a rack loading up **to 300 kg** totally.

7 – Insulation

A high insulation is assured using **compressed panels** and **flocks of rock wool**. Our experience taught us that the compressed panels give a heat barrier, but the flock wool allows thermic inertia. No toxic materials are employed, particularly asbestos.

8 – Control panel

The oven is provided with a control board very easy user impact, showing by means of ideograms all functions.
It has one digital and one mechanical thermoregulator, timers for baking and steam, on/off switches and emergency stop key.
On request the oven is available with the **electromechanical controls** or with **digital** and **programmable** panel.
In additional the digital panel is managed from software by a personal computer.

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Rotating Rack Ovens **Performance**

9 – Performance

- Maximum baking temperature is 300°C.
- Time of continuous running is 24h/24h.
- Temperature decreasing when opening the door is around 20° C.
- Average gradient of temperature rise around 8-10° C/min.
- Rack rotation speed is 3.625 tr/min.
- The temperature of external panels surface is not exceeding 25°C the ambient temperature.
- Rack suspension system or turntable suitable for a total rack loading up to 300 kg.
- Insulation with compressed panels and flocks of rock wool. No toxic materials are employed, particularly asbestos.
- The CE Declaration of Conformity is submitted with the machine.

10 – Steam system, Hight Performance Steam Device

Our experience allowed us to realize a **high performance steam system**. This modular system is made up of consists of a set of U elements, arranged vertically and alternate. The water, injected at several levels, flows cascading all along their length (**ml 26,25 long**), in the model Rotor 68. The surface of steam generator is doubled thanks to the employ of structured cylindrical elements inside the U channels (in the circular surface the rate surface/volume increases). By this system also the mass becomes relevant, for instance in the model Rotor 68 the total weight of the steam generators is 198 kg.

The surface is necessary to produce the most possible quantity of steam, while the volume (mass allows the heat keeping for a faster recovery of the temperature. It is necessary a large quantity of instant steam to optimise the baking of the crust.

Not only the quantity of steam increases thanks to a bigger surface of the steam generator, but also the transformation of the water in steam happens instantly. The rapidity in the steam generation and its abundance give to the bread a shiny crust, avoiding any de hydration problems and the formation of bubbles.

The evidences are stated by the results. The model Rotor 68 transforms **4 l water in steam in only 20 seconds**. The recovery of temperature happens in 6-10 minutes, according to the type of product and to the oven.

Thanks to its modular characteristic the steam system may be **increased up to 46%** in the mass (kg 290 in Rotor 68) and **92%** in the generation surface.

11 – Guaranties

The guaranties are **1 year** on all the parts (except consumable) and **3 years** on heat exchanger.

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12 – Protection and safety devices

Safety thermostat: this device guards against overcoming of the temperature inside the oven over the 300 °C, the thermostat switches off automatically the voltage of the burner and stops any burner functions.
Microswitch: the door is connected with a microswitch. By opening the door interferes the micro switch and it stops immediately the rotation of the trolley and the ventilator, and it turns on the steam extractor.
Steam extractor: it is an extractor fan, installed above the hood, that operates by opening the door during the operation of oven's loading and unloading.
Inside door handle: it is installed on the door, on the baking chamber side. It avoids that the operator, for any reason, remains closed inside the baking chamber.
Friction clutch of the gear motor: friction of the gear motor that allows the stop by low couple.
Over pressure block: it has been installed above the combustion chamber, in the fumes pipe, to reduce quickly the pressure inside the combustion chamber. If the pressure increase over the calibration value, the block opens discharging upstream, in safety conditions for the operator, resetting the correct pressure inside the combustion chamber; at this point the block closes automatically.
Steam breather: the steam breather is an opening situated inside, on the bottom of the baking chamber. This, through a pipeline is connected with the steam extractor hood. When in the baking chamber the steam production reaches a limit value, this breather lets go out the exceeding quantity.

13 – CE compliant

The rotating rack oven is complying with the **CEE European** norms:

98/37 EEC	Machine Directive
73/23 EEC	Regulation on Low Voltage
89/336 EEC	Directive concerning the Electromagnetic Compatibility
89/109 EEC	Directive concerning materials and the objects have to be in contact with alimentary products
90/396 EEC	Appliances burning gaseous fuels

To effect correct application of the safety and health requirements stated in the EEC Directives, the following Norms and Technical Specifications were consulted:

EN292-1	Fundamental concepts and general principles of projects
EN292-2	Fundamental concepts and general principles of projects
EN1673	Food processing machinery - Rotary rack ovens - Safety and hygiene requirement
EN294	Distances of safety for the superior arts
EN953	Projecting and construction of the Protection Devices
EN349	Minimum gaps to avoid crushing of parts of the human body
EN418	Emergency stop equipment, functional aspects - Principles for design
EN1088	Interlocking devices associated with guards - Principles for design and selection
EN1050	Safety of machinery - Principles for risk assessment
EN45014	General criteria for suppliers' declaration of conformity
EN203-1/2	Gas heated catering equipment
EN60204-1	Electrical equipment on the machines
prEN 563	Hot Surfaces which could be dangerous
C.M. N. 68	Thermical implantations
C.M. N. 73	Thermical implantations

89/392/EEC; 91/368/EEC; 93/44/EEC; 93/68/EEC

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Rotating Rack Ovens **Technical features**

14 – Technical features

ROTOR MODEL

Model	Trays	Trays dimension	Indicative hourly capacity	Dimensions 			Thermic power	Thermic power	Power	Weight
	nr.	cm	Kg/h	A mm	B mm	H mm	kw	kcal/h	kw	kg
57	15/18	40x60 50x70	85	1239	1619	2068	53	45000	1,7	1250
68	15/18	60x80	125	1440	1930	2220	68	58000	2.5	1430
88	15/18	80x80	170	1630	2140	2220	82	70000	3.0	1700
89	15/18	80x90	190	1630	2140	2220	82	70000	3.0	1700
610	15/18	60x100	160	1630	2140	2220	82	70000	3.0	1700
810	15/18	80x100	210	1820	2460	2500	93	80000	3.8	1900
812	15/18	2x(60x80) 120x80	250	2000	3000	2600	116	100000	3.8	2100

ROLLER MODEL

Model	Trays	Trays dimension	Indicative hourly capacity	Dimensions 			Thermic power	Thermic power	Power	Weight
	nr	cm	Kg/h	A mm	B mm	H mm	kw	kcal/h	kw	kg
68	15/18	60x80	125	1910	1550	2220	68	58000	2.5	1550
88	15/18	80x80	170	2110	1750	2220	82	70000	3.0	1760
89	15/18	80x90	190	2110	1750	2220	82	70000	3.0	1760
610	15/18	60x100	160	2110	1750	2220	82	70000	3.0	1760

* 1KW = 860 kcal/h 1000 kcal/h = 1.163 KW

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15 – Connection

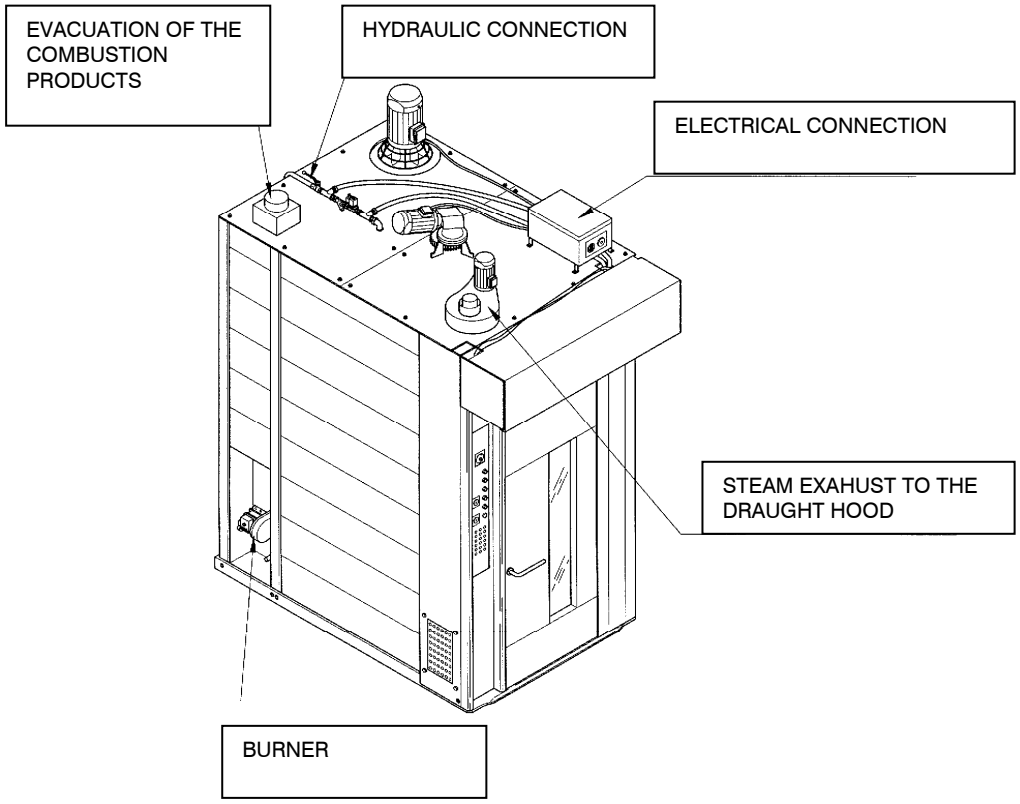
Hydraulic connection: the connection is necessary for the vaporizer of the oven and must have a minimum diameter of 12 mm and provide filtered water. The outline connection is ½ inc.
The water pressure reaching the vaporizer is between 1.0 and 3.0 bar.
The input connection is on the ceiling (O 1/2") (1) and the output connection is under the burner (h mm 50, O 3/4") (2).

Steam exhaust to the draught hood: the exit diameter is 18 cm. (26 cm for the model 812). In the coupling area with the exterior piping (this must have a min. section of 0.035 m2) it is better to install a box with dimensions of mm 400 x 500 x 400.
The piping of steam exhaust must be slightly inclined to avoid the condensate returns in the oven, with a depression within 0.1 - 0.4 mbar.

Evacuation of the combustion products: the exit diameter is 20 cm. (23 cm for the model 812). It is necessary to consider that - in order to obtain a good functioning of the plant - on the base of the chimney there must be a depression within 0.1 - 0.2 mbar. If possible avoid to install curves in the piping. If chimney and piping are outside the building, it is good standard to cover them with heat insulator materials to obtain a good draught also in the cold season and to avoid vapour condensations.

Electrical connection: verify that the voltage of the electric line to the electric box corresponds to the voltage required in the electrical diagram and on the label.
Normally and if there isn't any different request, the connection is 3 phases + neutral, 400 voltage and 50 Hz. Standard the box can be placed on the ceiling or on the left side.

Gas connection: the burner need a connection of ½ ,¾ or 1 inch (see the its manual).



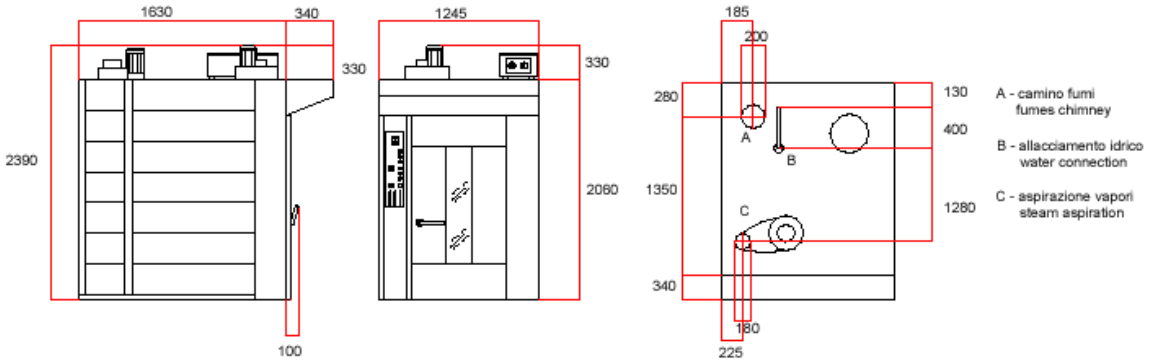
16 - Package

The oven is delivered:

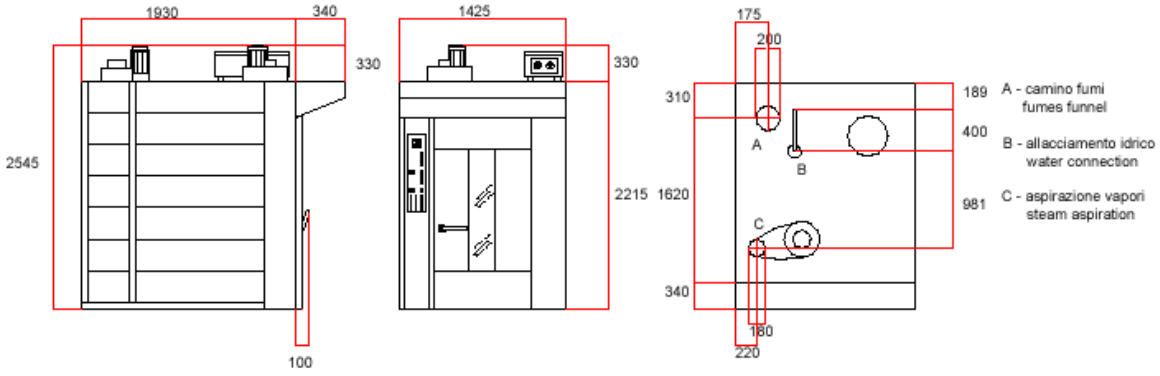
- fully **disassembled** with components in wooden crates with following dimensions in cm. :

115x225x225	Kg. 1300	model Rotor 50x70;
145x225x225	Kg. 1480	model Rotor 60x80;
145x225x225	Kg. 1600	model Roller 60x80;
160x225x225	Kg. 1750	model Rotor 80x80, 80x90, 60x100;
160x225x225	Kg. 1810	model Roller 80x80, 80x90, 60x100;
115x225x225x2box	Kg. 1950	model Rotor 80x100;
115x225x225x2box	Kg. 2150	model Rotor 80x120.

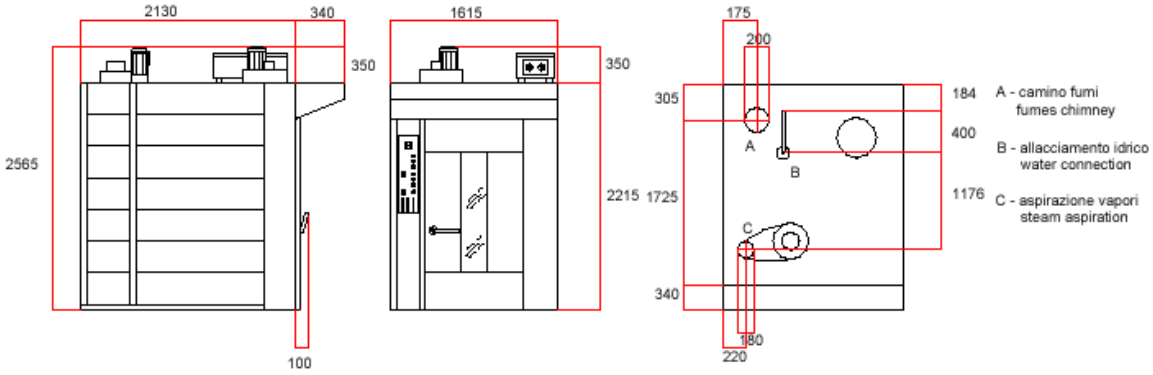
- **partially assembled** (semi assembled. Motors, fans, panel and electric box not installed. For container shipment or track long time transport);
- **fully assembled**:



ROTOR mod. 57



ROTOR mod. 68



ROTOR mod. 88-89-610

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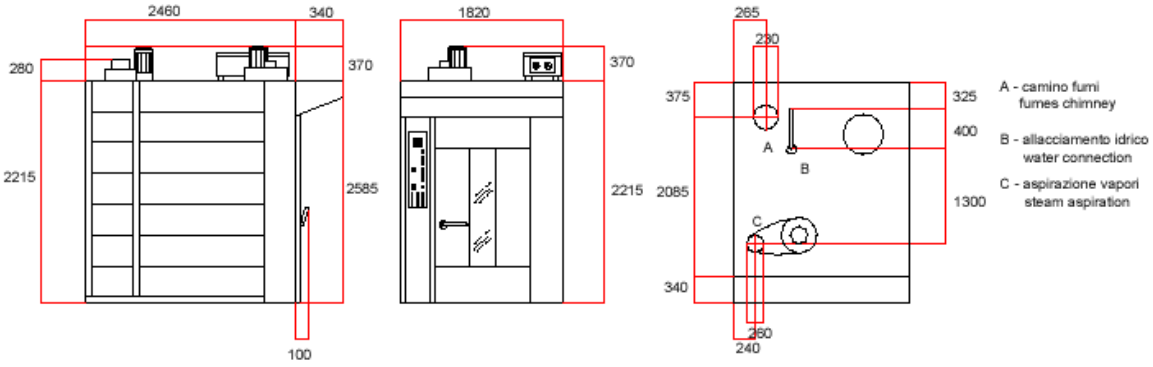
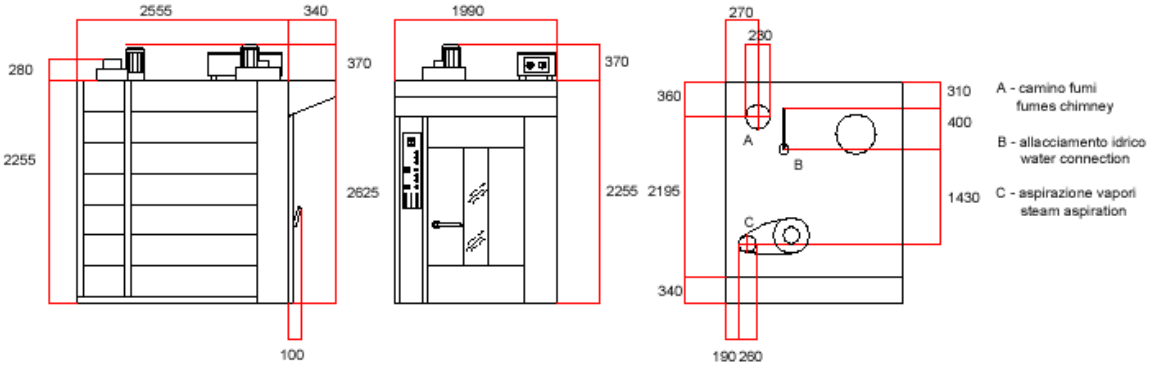
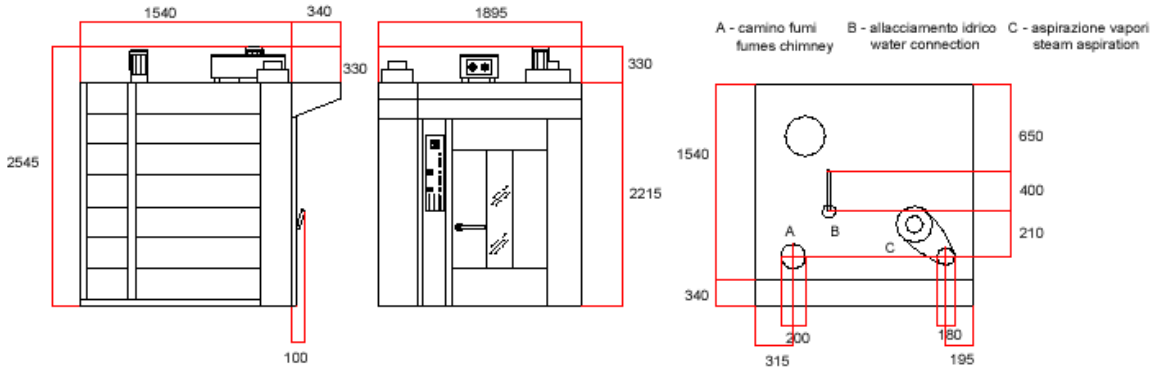


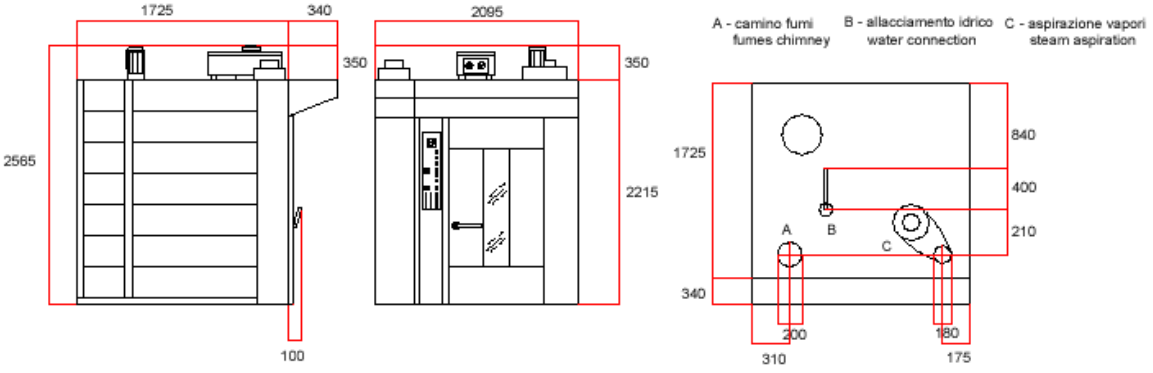
ROTOR mod. 810



ROTOR mod. 812



ROLLER mod. 68



ROLLER mod. 610-88-89

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17 - Fuels

The oven is functioning with a burner using following fuels (see the manual of the burner):
- **Diesel**
- **Gas methane**
- **LPG (Liquefy Petrol Gas)**

Fuel type	Burner type	Boost pressure Mbar	lower heating power
DIESEL	BLOWN	12	11.5 kW/kg
GAS METHAN (G20)	BLOWN	12 - 14	10 kW/m^3_n
L. PETROL GAS -GPL (G30)	BLOWN	12 - 14	13 kW/m^3_n

Oven model	Diesel burner	Burner brand	Nozzle	Kw min-max	Kg/h min-max
57	40 F 5	RIELLO	0.75x 60°	30-60	2.5-5
68	40 F 10	RIELLO	1.50x 60°	54-107	4.5-9
88	40 F 10	RIELLO	1.75x 60°	54-107	4.5-9
89	40 F 10	RIELLO	1.75x 60°	54-107	4.5-9
610	40 F 10	RIELLO	1.75x 60°	54-107	4.5-9
810	40 F 10	RIELLO	1.75x 60°	54-107	4.5-9
812	40 F 20	RIELLO	2.50x 60°	95-202	8-17

Oven model	Gas burner	Burner brand	Kw min-max	Kcal/h min-max
57	40 FS 5	RIELLO	23-58	20000-50000
68	40 FS 8	RIELLO	46-93	40000-80000
88	40 FS 8	RIELLO	46-93	40000-80000
89	40 FS 8	RIELLO	46-93	40000-80000
610	40 FS 8	RIELLO	46-93	40000-80000
810	40 FS 15	RIELLO	81-175	70000-150500
812	40 FS 15	RIELLO	81-175	70000-150500

ATTENTION: The ovens can have or are changed into electric power any time.

Oven model	Electric	Kw Max on starting	Kw Max on working
57	E	(16X2400W) 36.0	(8X2400W) 18.0
68	E	(20X3000W) 54.0	(10X3000W) 27.0
88	E	(20X3400W) 61.2	(10X3400W) 30.6
89	E	(20X3400W) 61.2	(10X3400W) 30.6
610	E	(20X3400W) 61.2	(10X3400W) 30.6
810	E	(26X3400W) 81.6	(12X3400W) 54.4
812	E	(26X4200W) 100.8	(12X4200W) 67.2