

**Kwant - Hydrodynamic water heater
Model Rioeccellent/Rios
Installation and maintenance guide**



Table of Contents

General instructions	3
Description	5
Technical data	5
Dimensions	6
Electrical connections	7
Getting started	8
Maintenance	9
Warranty	9
Example on how to calculate the efficiency of the unit	10

General instruction

This guide is part of product. Information contained in it has to be read both by the installer and the customer.

Keep this guide for future reference.

Please read the following information carefully as it sets out important recommendations for the installation, using, maintenance and safety of the product.

Model “Rioeccellent”/”Rios” is designed developed and patented by the firm “Kwant”. The use of the most up-to-date technology enables us to produce hot water for heating systems and household purposes with a significant reduction in the amount of energy consumed and without any pollution to the environment (100% emission free).

The operation of the unit is based upon the widely known principle of direct cavitation within the layers of liquid. Heat is created by the “collapse” of the cavitation bubbles. A hydrodynamic generator receives a thrust of water created by the pump. A rapid reduction of water pressure in the layers disrupts cavities and micro bubbles of gas/ vapour are formed. With the alteration of a range of “shock” waves and counter-phases, the liquid strives to return into its initial condition, therefore causing the collapse of the micro bubbles. During this process the speed of “collapse” reaches 1-1.5 km/s, and the gas located inside the micro bubbles does not manage to produce condensation. Subsequently, gas, not vapour, is involved. At the speed of compression in the centre of micro bubble, strain fields arise, which form a shock wave moving from the centre to the sides. At this moment, the temperature of the gas inside the micro bubble can reach tens of thousands of centigrade. In practice, this is a micro sphere of plasma, which has a very short life span. This creates a micro explosion, namely, the transformation of mechanical energy (through shock waves) into thermal energy.

As the layered cavitation created in the system is a directed and controllable one, it does not cause any harm to the mechanic part of the Unit. This process significantly reduces the cost of producing hot water and heating.

The unit is equipped with an automatic temperature adjuster, with temperatures ranging from 60-80C. The unit works automatically. For example, upon reaching 80C the system switches off and it is possible to use a determined amount of hot water for household purposes, depending on the capacity of the model. If however the temperature drops to 60C the heat-up system automatically switches on and the temperature increases. We have carried out tests during the summer and winter months to monitor its efficiency. During the summer period, with the central heating switched off, from 24 hours a day the system works for, on average, 1-1.5 hours. In the winter period, the amount of time the system works directly depends on the temperature set by the thermostat.

Production of hot water for household purposes is created by the heat exchange between the initial cycle of the working liquid and the secondary one, into which the water flows from the water pipeline. For example, when the Unit Model 2 is switched off, it has a 160 litre boiler with an average temperature of 75°C, thus the amount of stored heat energy is equal to $160 \times 75 = 12000$ kcal = 13.95 kV.

Considering that the temperature of the basic water is 13°C, in this example, we can calculate:
 $160 \times (75-60) / \Delta 35 = 68$ litres of water at 48°C (EN-625).

When the temperature in the internal tank is lower than 60°C, the pump starts to operate in order to restore the consumed heat energy, as the temperature of the boiler is 60°C.

Then, at outlet, we can guarantee a temperature of not lower than 48°C. For example, when using a shower, after consuming 68 litres of water; it does not mean that repeated use of the shower is impossible. The pump with a heat output of 12 kW (12x860 = 10320 kcal) plus a boiler which has a residual thermal capacity will produce: $((160 \times 12) + 10320) / 35 = 359$ litres of water per hour at a temperature of 48°C. Taking into account that the actual temperature of the water used in a shower is lower than 48°C (approximately 38°C-39°C), we can assure this system provides a secure and sufficient supply of hot water for household purposes.

This system operates also very well with low-temperature heating systems, such as under floor heating and heating through floor laths because these systems have a small amount of carrier and a small delta of temperatures at inlet and outlet.

Installation of the heating unit has to be done by qualified personnel **only** in accordance with local regulations and manufacturer's requirements.

After removing packaging, check integrity of the product. If in doubt don't use the product and contact the supplier.

Danger: Please keep the parts of the packaging away from children, as they may be a potential source of danger.

The unit heats the water at a temperature lower than the boiling temperature at the normal atmospheric pressure.

Unit has to be installed for a space compatible with its power features.

This product has to be used for the purposes it was designed only.

Using of the product in any other purposes than the ones it was designed for may be dangerous.

Manufacturer is not responsible for the damages caused by the misuse or unauthorised modification of the components of the product.

Failure to comply with above instruction could invalidate the warranty.

The unit is an electrical household appliance and the norms applied to evaluate its safety must comply with the given category.

The utilisation of electrical appliances involves compliance with fundamental regulations as:

- Do not touch the product with wet parts of body
- Do not pull electrical power cables
- Children or incompetent persons must not use the product
- Electrical power cable must be replaced exclusively by a licensed electrician
- Do not use extension leads or multi sockets
- Do not obstruct ventilation areas.
- Do not clean the unit when working.

In case of bad functioning is recommended to disconnect the unit. Further repairs should be carried out by service organisations authorised by the manufacturer only and using exclusively original replacements.

Failure to comply with above instructions may conduct to bad functioning and danger for user.

Correct periodic maintenance carried out by qualified personnel guarantees efficiency and long duration.

For installation of the unit there is no need of special rooms, as it does not use any kind of fuel consequently there is no gas emission and there is no need of emission pipes.

Description

Hydrodynamic heating unit: ground version.

Model _____

Registration nr _____

The cabinet of the unit is made from zinc-coated steel painted afterwards and equipped with anti vibration base. The case is covered inside with insulation panels.

Unit has to be installed on a straight foundation.

The unit itself consists of two stainless steel tanks (cylinders) in one of which is installed a hydrodynamic generator manufactured by KWANT. In the other cylinder is installed a highly effective water pump manufactured by LOWARA.

Both cylinders are connected and have a close cycle. Inside of cylinders there are two heat-exchanging loops. The first one is for the heat of water for central heating system and the second is for the flow of water for household purposes.

By using this system we avoid the build-up of scale on the heat exchanging elements, which considerably quickens the time of its operation along with increasing the ratio of heat output.

The unit is equipped with an electronic control panel, safe-closed and **not accessible for the user**.

All electrical connections have to be made by qualified personnel.

Minimum Domestic water inlet pressure must be 2.5 Bar.

Technical data

Manufacturer has set up maximum temperatures.

Hot water for household purposes -- 48°C

Hot water for the central heating system: 60°C - 80°C.

It is prohibited to change maximum temperatures set up by the manufacturer.

Water flow rate at 48°C – 13l/min

The cabinet of the unit is made from stainless steel – AISI 304

2.5 bar safety valve is installed on top of the cylinder.

Nominal thermal power _____

Quantity of water _____

Dimensions

Unit Rioecellent (with internal tank)

Model	Voltage	Power of pump	Output to central heating	Size		
				Width	Depth	Height
№	kW	kW	Kcal	cm	cm	cm
Model 1a	220	3	6000	86	45	120
Model 1b	380	4	7900	86	45	120
Model 2a	380	5.5	11000	86	45	160
Model 2b	380	7.5	15000	86	45	160
Model 3a	380	7.5	15000	86	45	190
Model 3b	380	11	22000	86	45	190
Model 3c	380	15	30000	86	45	190

Unit Rios (with external tank)

Model	Voltage	Power of pump	Output to central heating	Size		
				Width	Depth	Height
№	kW	kW	Kcal	cm	cm	cm
Model 1	380	5.5	11000	45	35	120
Model 2	380	7.5	15000	45	35	120
Model 3	380	11	22000	50	45	156
Model 4	380	15	30000	50	45	156

Electrical connections

The unit is an electrical household appliance and rules applied to evaluate its safety must comply with the given category.

Electrical connections must be made in accordance with local regulations and manufacturer's requirements.

Nominal power _____

Energy voltage 380V, 3 fases+T+N/220V

Frequency – 50 Hz

Before starting up the unit check if electrical connections comply with the local regulations.

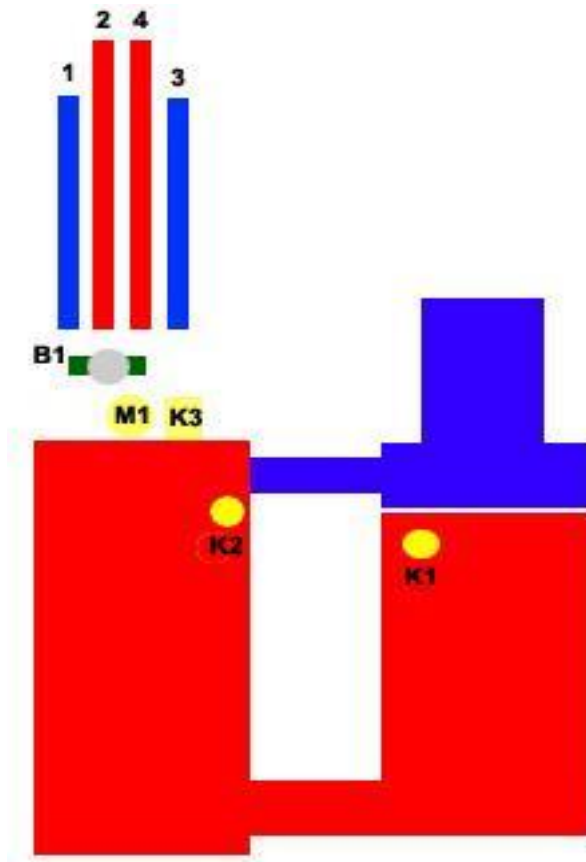
Utilisation of electrical appliances involves compliance with fundamental regulations as:

- n** Do not touch the product with wet parts of body
- n** Do not pull electrical power cables
- n** Children or incompetent persons must not use the product
- n** Exclusively a licensed electrician must replace electrical power cable
- n** Do not use extension leads or multi sockets
- n** Do not obstruct ventilation areas
- n** Do not clean the unit when working.

Getting started

Pipe connection

- 1 – input of cold water mains 1/2" -- Min 2.5 bar
- 2 – output of hot water for household purposes 1/2"
- 3 – input from central heating system 3/4"
- 4 – output to central heating system 3/4"
- K1 – air release valve 2.5 bar
- K2 – air release valve
- K3 – air safety valve
- M1 – manometer
- B1 -- ball valve



Step-by-step actions

- 1) Open air release valves K1 and K2
- 2) Open ball valve B1
- 3) Fill up the cylinders operating valve K1 manually, until the water reaches K1 level
- 4) Close K1 valve
- 5) Allow air from cylinder through K2 valve to escape, until the water in the cylinder reaches K2 level
- 6) Close K2 air release valve
- 7) Close B1 ball valve

Plug in and turn on the unit and wait until water reaches 80°C, keep M1 manometer under control. In case manometer shows a pressure superior to 1 bar, let the air from K3 safety valve to escape, hot water may come out. It is recommended to check the water hardness. Particularly for hard water it is recommended to use filters to prolong lifetime of heat exchangers inside the cylinders.

The unit is equipped with an automatic temperature adjuster with temperatures ranging from 60°C to 80°C. The unit works automatically. For example upon reaching 80°C the system switches off and whenever a hot tap or shower is turned on, the incoming cold water mains will decrease the water temperature in the cylinders. When the temperature will drop to 60°C the unit will switch on automatically. And the above cycle will repeat again.

Maintenance

Maintenance is on customer's responsibility and has to be made after reading this manual. Before any intervention of maintenance, make sure the unit is switched off. Manufacturer is not responsible for damages caused by the improper maintenance actions.

Maintenance is restricted only to:

- Check of water level in the cylinders trough K1 valve. If water level is insufficient, step-by-step actions mentioned above must be repeated.
- Check the correct functioning of thermostats
- Check if ventilations of the motor are clean and unblocked.

Never change the water from cylinders.

In case of bad functioning of the unit contact the supplier.

Warranty

Unit Rioeccellent and Rios are offered with a full 5 years manufactures warranty on mechanical parts and labour and 2 years warranty on electrical connections. Ongoing service may be arranged through the Unda ltd Customer Services Department.