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1.0 - INTRODUCTION

We congratulate you on purchasing a Baitek-made inverse osmosis Watermaker and on choosing the quality and the reliability of LINEAR. LINEAR is manufactured with high-quality selected components, it has a completely automatic running, it will give an optimal fresh water from the water of sea.

Thanks to its extremely compact size, it will take up a very small space onboard. The LINEAR, is easy and fast to install, solves all fresh water problems onboard.

This manual contains the whole instructions for installation, maintenance and the correct management in order to get the best performance of the watermaker.

Our range of products is developed in order to meet quality and running high standards required, therefore we suggest the end-user to buy only pure spare parts and materials, available in our authorized retailers.

2.0 - WATER TYPOLOGY

The water is a mixture of two elements: hydrogen and oxygen. It is never a pure element, there are always some substances that render the water “unique” in some way.

The sea water contains a high quantity of sodium chloride (NaCl), but its composition is extremely varied and variable. Generally speaking we can say that there are different nature salts and organic substances in sea water.

LINEAR has been developed in order to work and supply fresh-water, in whichever salinity condition and composition of the sea-water, in close docks (such as the Mediterranean Sea where there is a purer salinity), open sea or brackish water (such as river mouths).

3.0 - WORKING PRINCIPLES

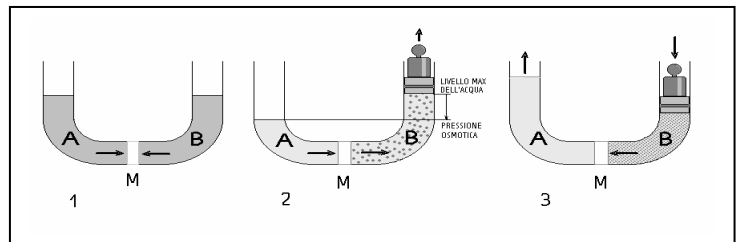
3.1 – Inverse Osmosis

The functioning of the LINEAR Watermaker is based on the inverse osmosis principle.

The inverse osmosis is the best one between the treatments of the water, above all for the purifying and desalination processes.

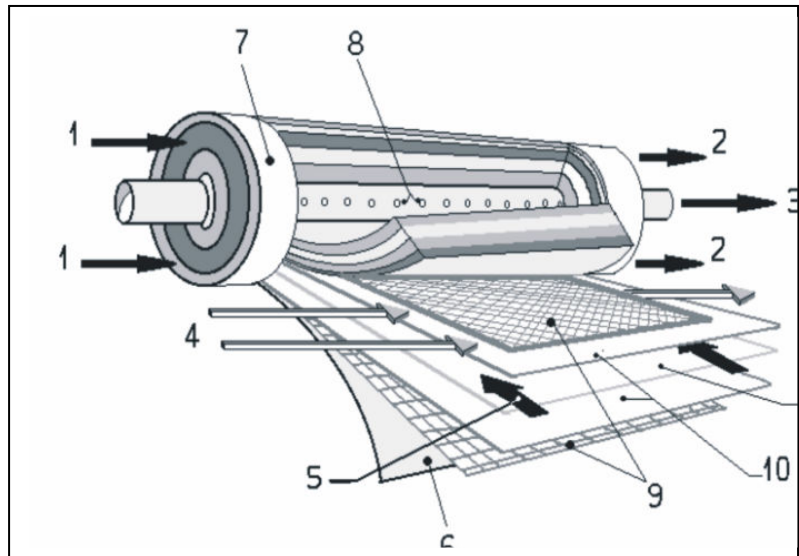
The **osmosis** one is a natural process that happens in all the biological systems, is the spontaneous passage of a pure dissolvent towards one more concentrated solution, through a **semi-permeable** membran.

During the **inverse osmosis**, the natural direction of the flow comes turned upside down applying a pressure on the more concentrated solution. The water to treat enters in the osmotic module with a determined pressure brushing the membranes. A part of the water crosses it and comes collected, with a remarkable decrease in salts and polluting substances (fresh water), in the centre of the tube. The rest of the water with a higher salt tenor (drainage) exists from the module, after having completely covered it.



3.2 - *Semi-permeable membrans*

- 1 Acqua da trattare
- 2 concentrato
- 3 permeato
- 4 direzione di flusso acqua da trattare
- 5 direzione di flusso permeato
- 6 materiale di protezione
- 7 testata sigillata
- 8 fori raccolta permeato
- 9 distanziatore
- 10 membrana
- 11 collettore permeato



The **semipermeable membranes**, used in the production of BAITEK Watermakers, are constructed in synthetic material with spiral structure and packed in very distinguished packaging, called **modules**. The membranes, suited for desalinate sea-water, have a salt reaction of beyond 99% and can operate until 40°C water temperature.

3.3 – Process Description

The LINEAR is a system of inverse osmosis that associates the filtering action of a system of pre-filtration (in cartridges of polypropylene) to that perm-selective one of the membrans. The water comes pre-filtered in order to remove solids and particles in suspension bigger than 5 micron. After this pre-filtration the water is sended, through a piston pump, with a much elevated pressure (60 bar), to the inside of vessel (an osmotic module) where the osmosis membran is, which realizes a remarkable separation of dissolved salts. The system therefore removes, beyond to chloride of sodio salts, also those injurious substances presents in waters in great quantity. The osmosis membrans, when integral, is not attachable from virus or bacteria.

4.0 – TECHNICAL CHARACTERISTICS

<i>Power</i>	<i>230 VDC</i>
<i>Electrical Absorption</i>	<i>450 Watts</i>
<i>Running Pressure</i>	<i>55 Bar</i>
<i>Fresh water produced</i>	<i>50 lt/h.</i>
<i>Running Temperature</i>	<i>1 – 45° C.</i>
<i>Pre-filtering</i>	<i>Cart. 5 micron</i>
<i>Automatic stop</i>	<i>70 Bar</i>
<i>Running PH</i>	<i>4 – 9</i>
<i>Chlorine tolerance</i>	<i>< 0,1 ppm</i>
<i>Typical salt rejection</i>	<i>99%</i>
<i>Conductability of the water produced</i>	<i>< 400 ppm</i>
<i>Minimum pressure required</i>	<i>1 Bar</i>
<i>Dimension in cm.</i>	<i>69 x 33 x 26 (l x p x h)</i>
<i>Weight</i>	<i>28 Kg.</i>

Conditions of test to 25° with salinity of the entering water of 35.000 ppm TDS (NaCl). The quantity of produced water can vary according to the salinity level and to the temperature of the entering water.

5.0 - PACKAGING

The linear Watermaker is packed and shipped in a wooden box:

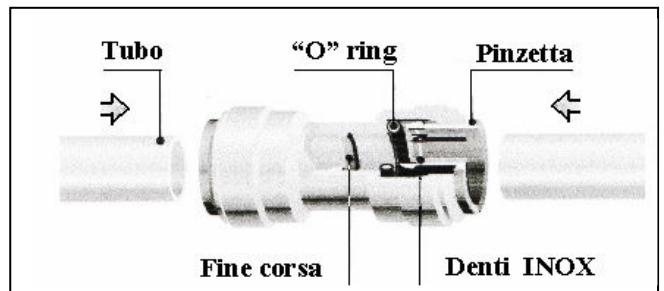
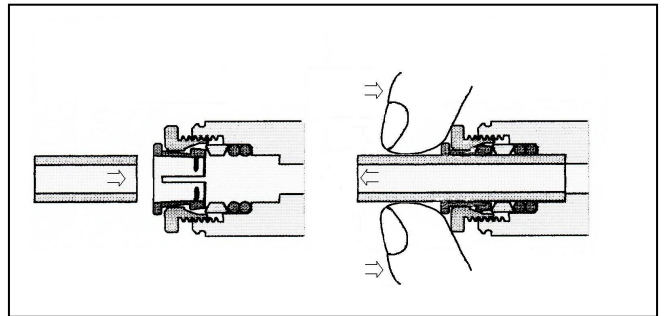
Dimension:	820 x 420 x 480
Volum:	0,16 mc.
Weight:	50 Kg.

6.0 - INSTALLATION

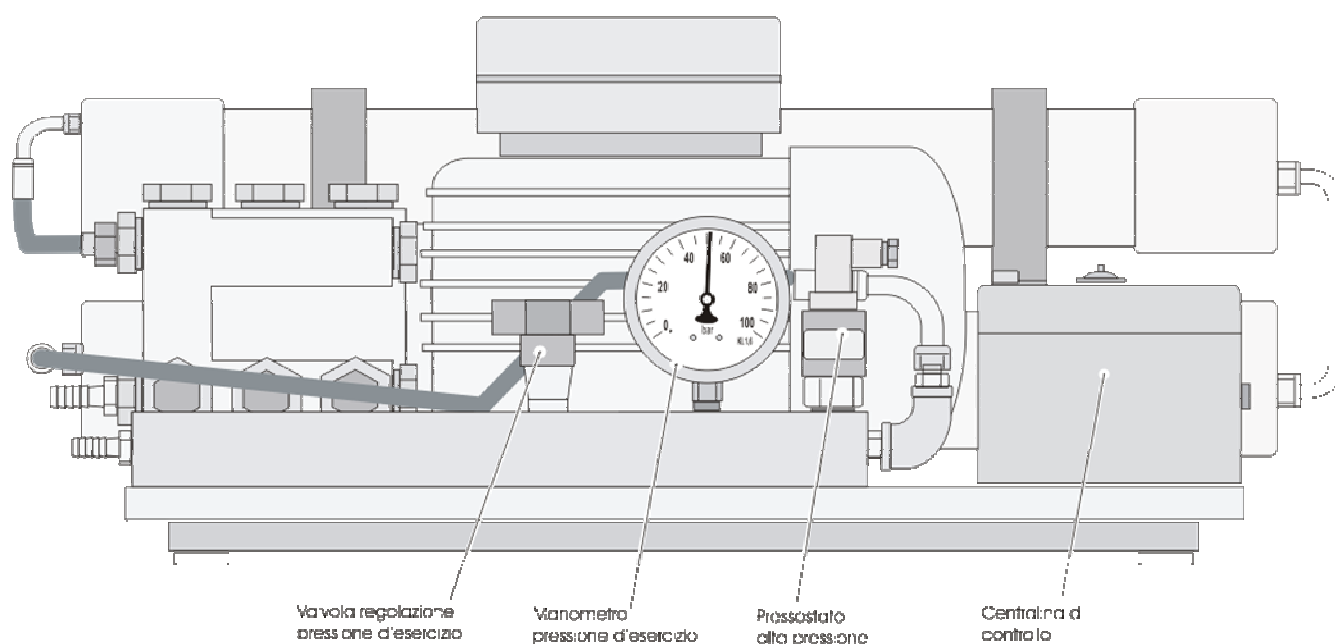
6.1 - HOW TO USE QUICK CONNECTIONS

- In order to realize a splice, cut the tube perpendicularly, to push the tube in the connection until parked position, then pull the tube in order to verify the occurred tightening.

- In order to proceed with the disconnection of the tube, push the tweezers to the bottom and parade the tube. **MAKE SURE** that the system is depressurized before parading the tube.



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6.2 - Installation

ATTENTION: the apparatus is not equipped with pump of throws (booster-pump), therefore for a corrected operation the installation under the waterline.

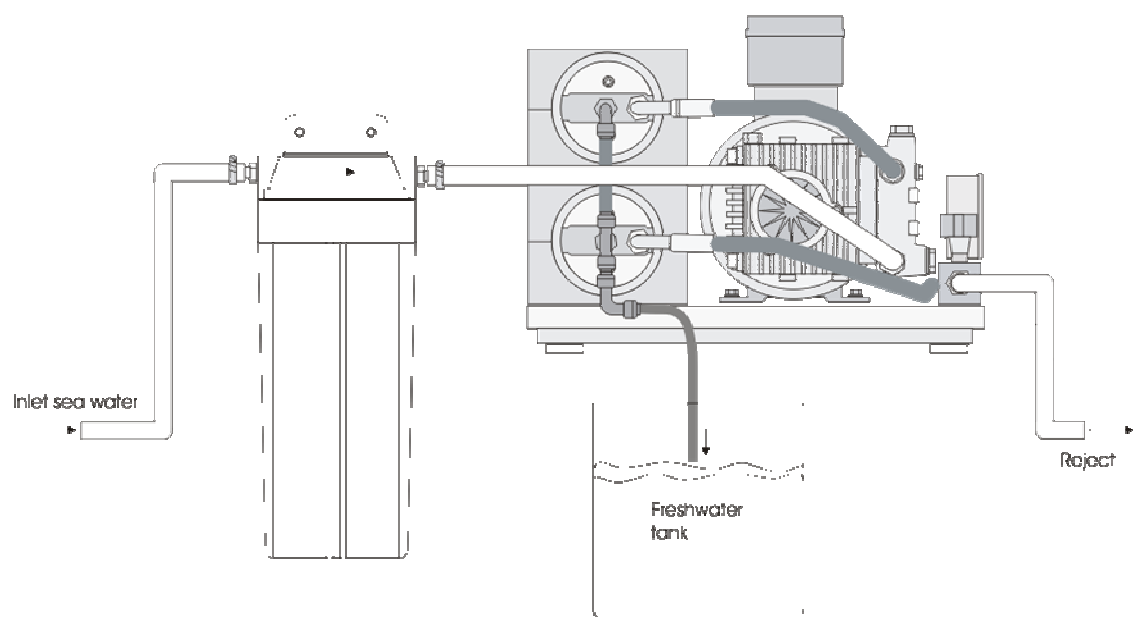
Before proceeding with the installation, locate the exact place where to install the system

6.3 – Hydraulic Connections

Fix the system on a plan surface or consoles with 6 millimeter bolts, using the affixed holes in proximity of the rubber base. Fix the filter in vertical position using the equipped support in stainless steel.

The installation of the filter under the waterline is very important, in order to avoid that air bubbles remain.

HYDRAULIC CONNECTIONS



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Connect the aspiration line of the sea-water from the nearer sea-water plug. It is indispensable to install a spere valve for interception in the sea-water plug and hold it closet during the periods of firm machine

Avoid I use a sea-water plug where other equipment is already connected.

If the sea-water plug turns out to be more then 2 mt spaced, we advise to install a high vaccum pump of adequate capacity (6 lt per minute), or to connect to an autoclaves located on the system of the sea-water.

Connect the fresh-water exit of the machine (located in the left side) to the tank of the water using a tube in polyethylene from 8 milimeter.

Connect the connection of drainage (“portagomma” 16 milimeter. or fast connection) on the left of the watermaker (see the drawing) to a sea-drainage located over the waterline.

6.4 – Electric Connection

The machine is already equipped with a feeding cable to connect the power line (230 VAC), therefore it does not need inner connection.

In the event it is necessary to install a feeding pump (pre-pump), an electrical connection has been foreseen, in parallel, to the electric motor of the system.

ATTENTION!

It is advised to insert at the bottom of the system a magnetothermal switch of protection with of suitable power.

7.0 - FIRST IGNITION PROCEDURE

7.1 - Ignition

Make sure that the valve of interception on the sea-water plug is opened.

Give tension to the watermaker from the magnetothermic switch previously installed to the bottom of the system. The green led will lights up located on the top left of the control panel in order to indicate that the system is connected to the feeding tension.

Open completely, turning the wheel in counter-clockwise sense, the valve of pressure regulation (located in the left side of the system).

Get the watermaker started through the START button located at the bottom on the left in the control panel, the same green led will light up in order to indicate that the system is running.

Make sure that the pre-pump (in the case has been installed) regularly inhales the water from the sea-water plug.

Attend 2-3 minutes, in order to allow complete exit of the air from the hydraulic circuit, therefore slowly turn in clock-wise sense the valve for the pressure regulation until the attainment of the working pressure of 60 BARS visualized in the gauge on the left of the regulation valve.

Proceed with incidental adjustments until the working pressure has not stabilized yet.

8.0 – PROTECTIONS FOR ALARMS AND CONTROLS

8.1 – High Pressare alarm

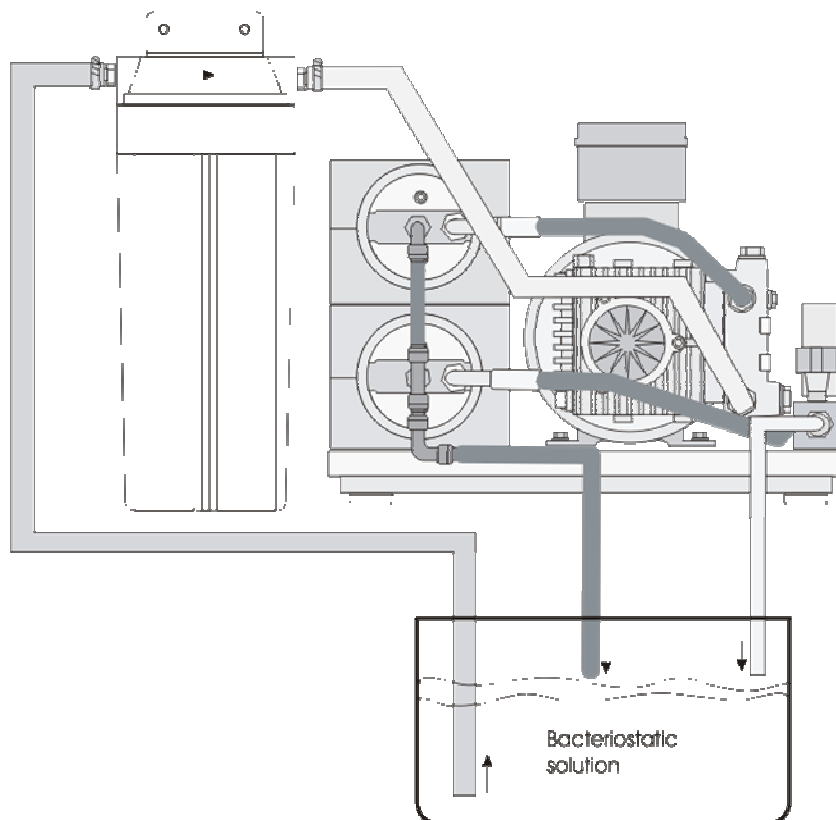
The Safety pressare switch gets an appropriate system start, in the case the working pressure voluntarily or involuntarily raises up to the 70 bars, causing a total BLOCK of all the functions of the system.

The alarm will be visualized in the central processing unit and in the remote control with the lighting up of "H.P. ALARM" led.

In order to restore the functions, light down the system through the switch of ignition. OPEN the valve for the pressare regulation and then get the system start again, bringing back the working pressure to 60 bars

ATTENTION: the alarm for elevated working pressure determines the complete block of all the functions of the system.

Extended arrest



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9.0 – EXTENDED ARREST FLUXING

This fluxing process must be carried out in order to maintain the membranes sterile in case of a long inactivity period of the watermaker. It will have therefore to be carried out only in the case a firm machine of beyond a month is foreseen.

Prepare a bacteriostatic solution in a box, melting gr. 100 of BIOCID 100 in 10 lt. of fresh water.

ATTENTION: Asses that the used water does not contain chlorine

Close the interception valve on the sea-water plug, remove the pipages on the incoming sea-water in the filter and the sea-drainage pipe in the watermaker.

Insert and block, with hose clamps, two fragments of rubber tube, dip the opposite extremities of the tubes in the container with the bacteriostatic solution.

Open completely, in counter-clockwise sense, the valve for pressure regulation, during the washing procedure, the gauge that indicates the working pressure must be in proximity of the zero.

Get the system starter and execute the fluxing procedure letting the system running for approximately 10 minutes.

10.0 - MAINTENANCE

10.1 – Pre-filtering

The LINEAR watermaker is equipped with a filter with standard filtering cartridge from 9,3/4" polypropylene made. The cartridge of the type "to lose" has a level of filtration of 5 micron.

The replacement of the filtering cartridge must be carried out every 100 hours of running of the system.

ATTENTION: it is indispensable to use only cartridges with degree of filtration of 5 micron.

10.2 – High pressure oil pump replacing

The checking of the level of the oil contained in Carter of the piston pump must be periodically carried out examining the appropriate level bar, unscrewing the yellow stopper in the advanced part of Carter. Use the appropriate hole in the advanced part of the system to extract the bar. In the anomalous event of oil level decreasing, check that there are no losses.

In order to empty and fill up the oil from the Carter of the pump, operate always through the yellow stopper in the bottom part of the pump, assisting the extraction with an appropriate syringe.

The first oil change must be carried out after the first 50 hours of running. Subsequently it must be replace every 500 hours of running.

USE multidegree oil SAE W 40

11.0 – EXCEPTIONAL MAINTENANCE

11.1 – Water pressure switch calibration

The calibration of the air pressure switch must be carried out only in case the system blocks before the attainment of the working pressure (55 bars).

The air pressure switch is calibrated when testing the system for a pressure of block to the attainment of 70 bar.

The air pressure switch is located in a collector in the left side of the system.

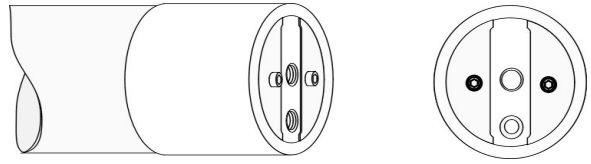
In order to calibrate the safety pressure switch, unscrew the screw, using of a normal cross screwdriver, and remove the connector.

Turn the air pressure switch inner screw, in clockwise sense, with a 2mm hexagonal key. Bring back the point of intervention to the original calibration. The system will block at the pressure of 70 bar, indicated from the gauge of the working pressure.

11.3 Membranes replacing

Before beginning the vessels opening procedure for replacing the membranes, **make sure the machine is depressurized** and proceed in the following way:

- Disconnect the tube from the fast plastic made connection, as described, and remove the connection itself;



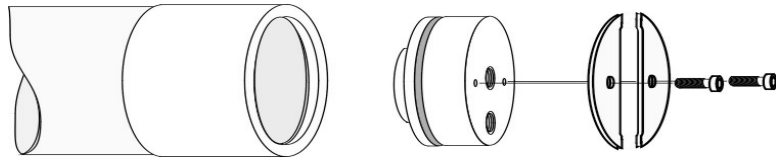
- Unscrew the high pressure stainless steel made connection, maintaining the double screw connection firm in it and subsequently removing it;

- With a 3mm hexagonal key, unscrew the two clamping screws of the semi-lunar shaped plates and then remove them;

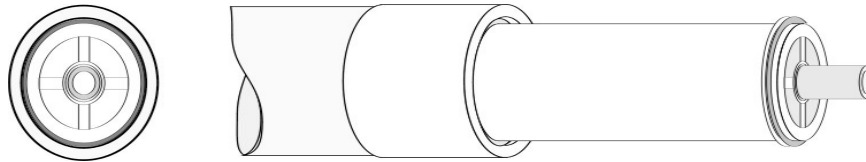
- Spingere il tappo leggermente verso l'interno per facilitare lo scorrimento delle placche verso il centro e quindi estrarle.

Slightly push the stopper towards the inside in order to facilitate the sliding of the plates towards the center and then pull them out.

- In order to facilitate the stopper pulling out , screw the connection in one of the cut-screw holes and strengthly pull;

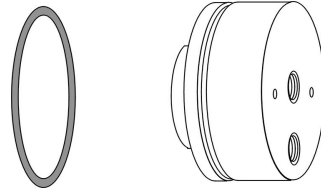


- Extract the membrane coupling it with a round spout clamp, without damaging it;



- Before introducing in vessel the new membrane, grease the rubber joiny and its two extremities with some vaselina lubricating, paying attention to locate it in the same position of the removed one;

- Replace and grease the closing stopper joint (O.R.) with vaselina lubricating and then reassemble it proceeding in the opposite way.



CONFORMITY DECLARATION

To the sense of the machine directive 89/392 and successive amendments.

The machines to the treat and the desalination water

BAITEK of Nicolò Bonomo

Are conformed to the following community directives :

Machine directive 89/392 CEE

And successive amendments **91/368CEE – 93/44CEE – 93/68CEE.**

Low voltage directive (DBT) 73/23/CEE

(transposed in the Italian national legislative rules law N. 791/77)

Harmonized applied norms :

UNI EN 292 PART 1 AND 2 (machine safety).

CEI EN 60204-1 (electric equipments safety).

**Besides, to the senses of enclosure III° and V° of the machine directive 89/392 CEE,
is declared:**

-The symbol marching CEE is on the machine

-The technique booklet is put disposal to the builder centre.

Marasala 22/03/2006

BAITEK
Bonomo Nicolò

WARRANTY CERTIFICATE

The Bonomo Nicolò's Baitek guarantees that the whole equipments and machines in his firm produced, are conformed to the technical specifies declared and are qualified to the foreseen applications.

The guarantee duration is of 24 months from the mailing goods date to the conditions in the back reported.

BAITEK di Bonomo Nicolò
Via Probo, 27
91025 MARSALA
Tel. 0923 722909
Fax. 0923 723246
e-mail: info@baitek.it
web: www.baitek.it

Model.....serial number.....

Corporate name/ Name, Surname.....

Address.....Tel/fax.....

Post code.....Town.....province.....

Retailer.....purchase date.....

13.1 GUARANTEE'S CONDITIONS

- 1- The system has a 24 month guarantee from the purchase date;
- 2- The word “guarantee” means the free replacing or repairing of the components that turn out to be defective due to fabrication reasons;
- 3- In case of irreparable breakdown, the manufacturer will replace the system at his firm opinion. The guarantee on the new system will continue until the end of the original contract;
- 4- All components that turn out to be defective due to negligence or negligence in the use (default in reading the instructions), wrong installation or maintenance, maintenances or repairs carried out from non authorized staff, damages from transport, or any circumstances that do not go back to fabrication defectives, are not covered with any guarantee;
- 5- The guarantee is moreover excluded in all the cases of improper use of the system.
- 6- The manufacturer declines every responsibility for accidental damages that can, directly or indirectly, result to persons, things and animals as a consequence of the lack in observing all the prescription indicated in the appropriate booklet and concerning instructions, especially those installation, use and system maintenance warnings;
- 7- The user has to pay for the “expenses contribution for home intervention”, in force at the day of intervention. The user has to pay for all the risks and freightage in case of shipping the under-guarantee system to our main building, or to customer service of ours.

14.0

TESTING CERTIFICATE

Model System..... Serial number.....

Customer:Address.....Tel.....

Town.....Installation date.....

Installer Firm.....Installer Technician.....

Notes:

Customer signature

Installer signature

14.0

TESTING CERTIFICATE

Model System..... Serial number.....

Customer:Address.....Tel.....

Town.....Installation date.....

Installer Firm.....Installer Technician.....

Notes:

Customer signature

Installer signature

15.0

MAINTENANCE CARD

[illegible]

15.1

MAINTENACE CARD

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