diagenode

Innovating Epigenetic Solutions

# DOUBLE HEAD PERISTALTIC PUMP

**Cat. No. B02030001** (TWI-PUMP)

**Version 6** I 08.11.10

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# Technical Assistance & Ordering Information


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http://www.diagenode.com/en/support/distributors.php
For the rest of the world, please contact Diagenode s.a.

# Contents

# Introduction

## Warnings

These instructions cannot claim to cover all details of possible equipment variations, nor in particular can they provide for every possible example of installation or operation.

Trouble-free and safe operation of the unit is dependent on proper transport and installation by qualified personnel.

## Guarantee

Limited one year global warranty. Diagenode guarantees its products against possible manufacturing defects in material and workmanship. Diagenode products are rigorously tested to ensure that the products you trust meet stringent standards. Consequently, if a problem occurs with a Diagenode product and the problem is caused by manufacturing defects in material and workmanship, Diagenode will, in its discretion, either fix or replace the product in accordance with the warranty terms and conditions stated herein. The warranty applies only to the first purchaser of the product for a period of one year starting from the date it was delivered.

In case of repair or replacement on a product under warranty, expenses will be at Diagenode's charge, including any costs required to return the repaired or replacement product to you. This warranty covers only manufacturing defects and does not cover any damage caused by misuse (non-respect of recommendations described in this manual), neglect, accidents, abrasion, exposure to extreme temperatures, solvents, acids.

We strongly recommend that maintenances or repairs on your product are performed by our approved Diagenode service center. Improper or incorrectly performed maintenance or repairs void this warranty.

## Intended use of the equipment

The pump device as well as all components from this parcel, including plastic nozzle connectors, tubing, strips and tube holders can be used as a junction between any Water Reservoir Chiller (min specification mentioned below) and a Bioruptor waterbath (Bioruptor®: one waterbath, Bioruptor® Twin: two waterbaths).

Any brand – any type: Bath circulator, immersion cooler,... – of Water Reservoir Chiller is suitable as long as:

- the capacity of the reservoir is 4 liters (min)
- the reservoir allows insertion of hoses
- the cooling power is 500 Watt (min) at external temperature of 20°C
- the cooling temperature range reaches 4°C (+/- 3°C)

**Warning:**
**Recirculating Chiller device (close loop without possibility of water reservoir) is not usable.**

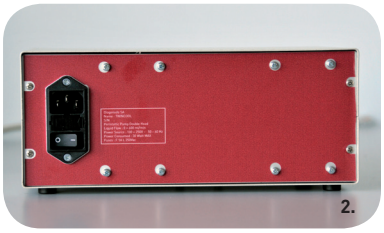
This equipment can be used to connect two Sonication Baths to a Water Reservoir Chiller.

This equipment is designed to be used for the above described application only. Any medical application is out of scope.

## Equipment Components

| | Component | Comments | Quantity |
|---|---|---|---|
| 1 & 2 | **Double head peristaltic pump** | - | 2 |
| 3 | **Plastic Nozzle Connector** | - | 2x2 |
| 4 | **Tie Wraps** | - | 10 |
| 4 | **Small Tie Wraps** | - | 4 |
| 5 | **Sturdy Tubing** | Inner diameter: 6,35 mm<br>Outer diameter: 9,25 mm<br>PharMed - BPT<br>Life time expected 1,000 hours | 2 pieces |
| 6 | **Silicon Tubing** | Inner diameter: 8 mm<br>Outer diameter: 12 mm<br>Transparent | 6 m |
| 7 | **Tube Holders** | Composed of two parts:<br>- one rigid plastic side<br>- one gluing side | 10 |
| 8 | **Black Plastic Connector** | - | 2 |

1.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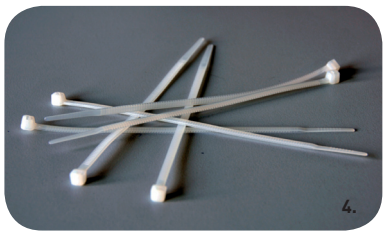
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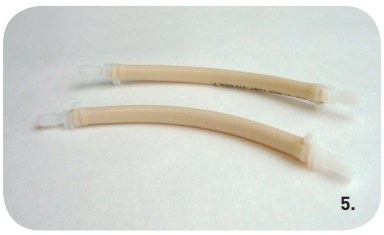
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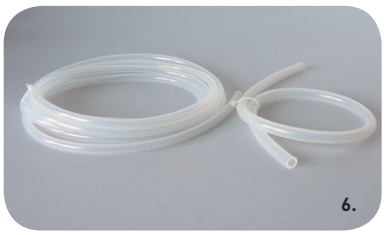
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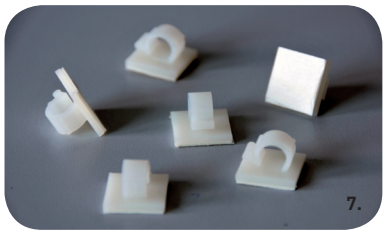
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## Technical Specifications

| Item | Description |
|---|---|
| **Dimensions** | 100 x 200 x 250 mm |
| **Weight** | 2.128 kg |
| **Motor type** | DC Geared Motor 8 - 4 VDC |
| **RPM** | 0 - 210 round per minute |
| **Discharge rate** | 0 - 610 ml per minute |
| **Discharge pressure** | 0,1 MegaPascal |
| **Suction Height** | 1,5 meter |
| **Tube size (inch)** | 1/4 (Inner Diameter) x 3/8 (Outer Diameter) |
| **Tube size (mm)** | 6,35 (Inner Diameter) x 9,525 (Outer Diameter) |
| **Tube matter** | Pharmed - Silicone - Fluran - Tygon LFL |

| Power supply single phase | |
|---|---|
| **Input** | |
| **Rated voltage Vin** | 100-240 V AC |
| **Voltage range** | 85...264 V AC |
| **Line frequency range** | 47...63 Hz |
| **Rated current Iin** | 0,7 - 0,35 A |
| **Double fused** | 1 A |
| **Internal circuits** | |
| **Rated voltage V** | 24 V DC |
| **Rated current** | 1,3 A |
| **Current limitation** | 2 A |

**Note:**
In case of infection, the entire water circulation loop (tubing) can be sterilised by autoclave or ethylene oxide as well as by gamma radiation.

## Environmental Conditions

Devices are designed to be safe under the following conditions:

- indoor use;
- altitude up to 2 000 m;
- operating external temperature 0°C to 40°C;
- fluid temperature 4°C to 50°C
- maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C, without condensation.
- MAINS supply voltage from 100V AC to 230V AC with fluctuations up to ±10% of the nominal voltage;
- transient overvoltages typically present on the MAINS supply;
- Degree of protection: IP20;
- POLLUTION DEGREE 2 (Normally only non-conductive POLLUTION occurs. Occasionally, however, a temporary conductivity caused by condensation is expected)

**Warning:**
**Never use in atmosphere with flammable gas. Pump motors may generate sparkles and may light fire or explosion in atmosphere with flammable gas.**
**Never use in any location where there is a possibility of extreme dust.**
**Environment exempt from sunlight is required.**

# Equipment installation

In the interest of safety, this equipment must only be installed by competent personnel after read and understood this section and considered any hazard involved. Even though no particular hazards have been identified during this installation.

Before starting installation work, turn the main switch off (beyond power connection) and secure the unit against being re-energized.

No special tools required.

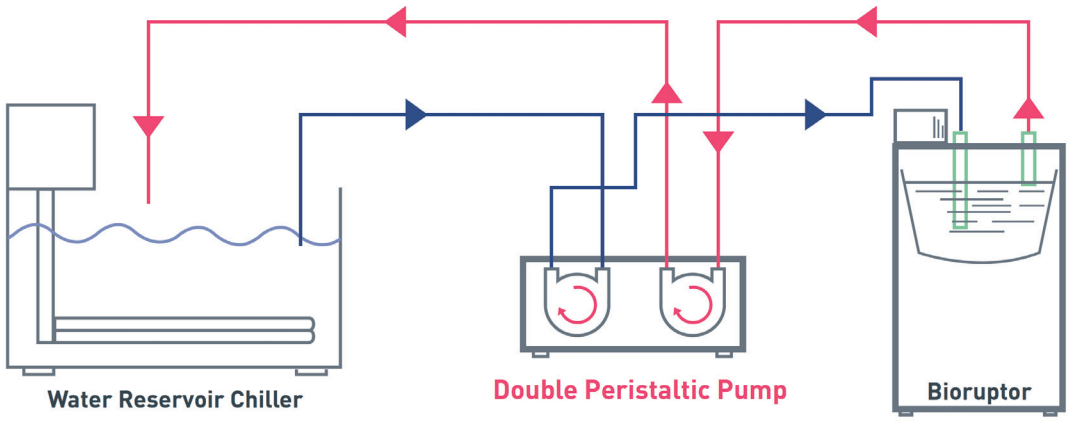
Installation shown below is performed on a NESLAB RTE Bath Circulator.

## Location Requirements

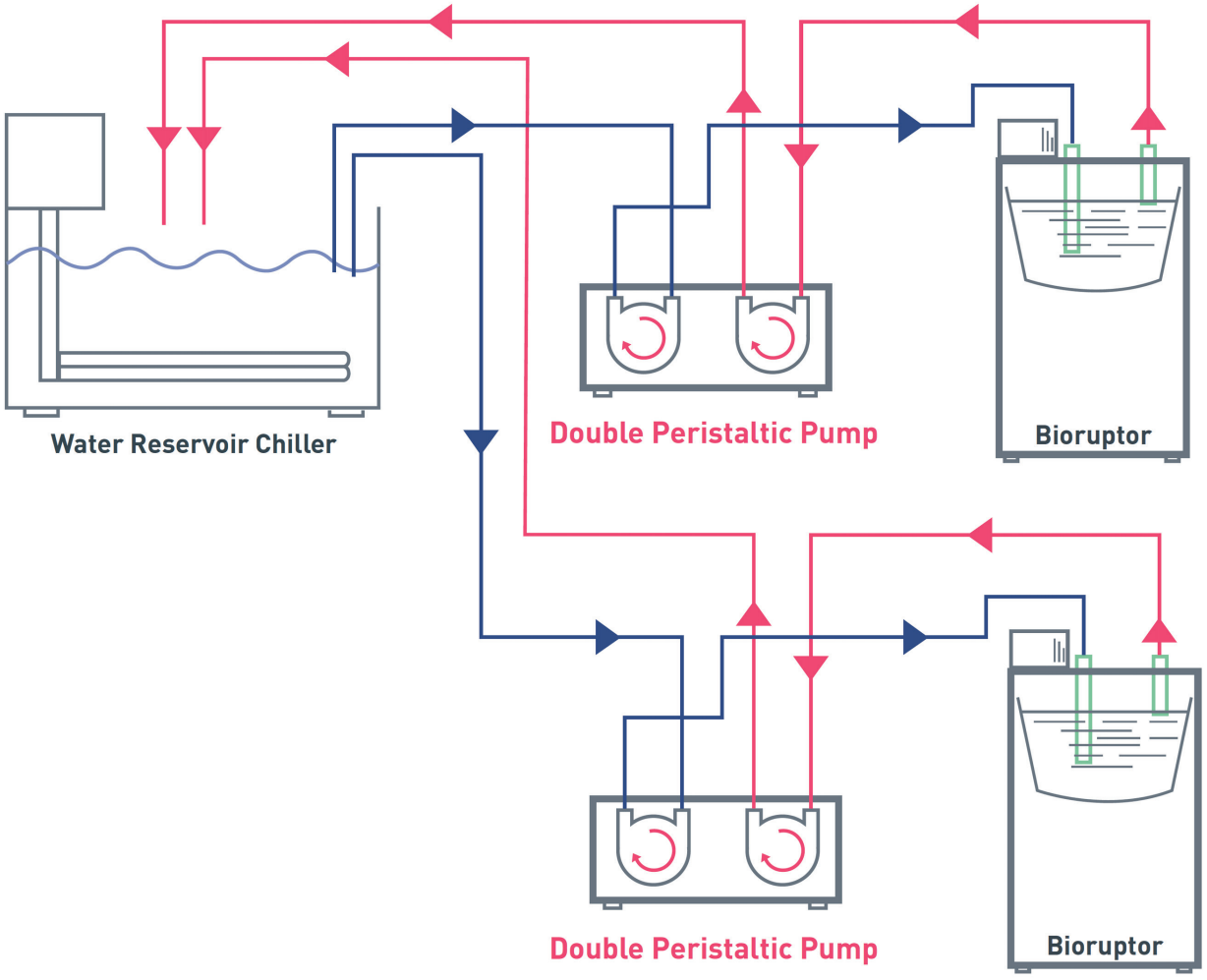
- Never install this equipment in a place where Environmental Conditions mentioned above are infringed.
- 3 meters square needed to set up the whole equipment.
- Distance between chiller and sonication baths should not be more than 1.5 meters, vertically or horizontally.
- Additional power plugs including earthing terminal needed for the pumps.

## Global scheme

a) Connection to Bioruptor®: one waterbath.



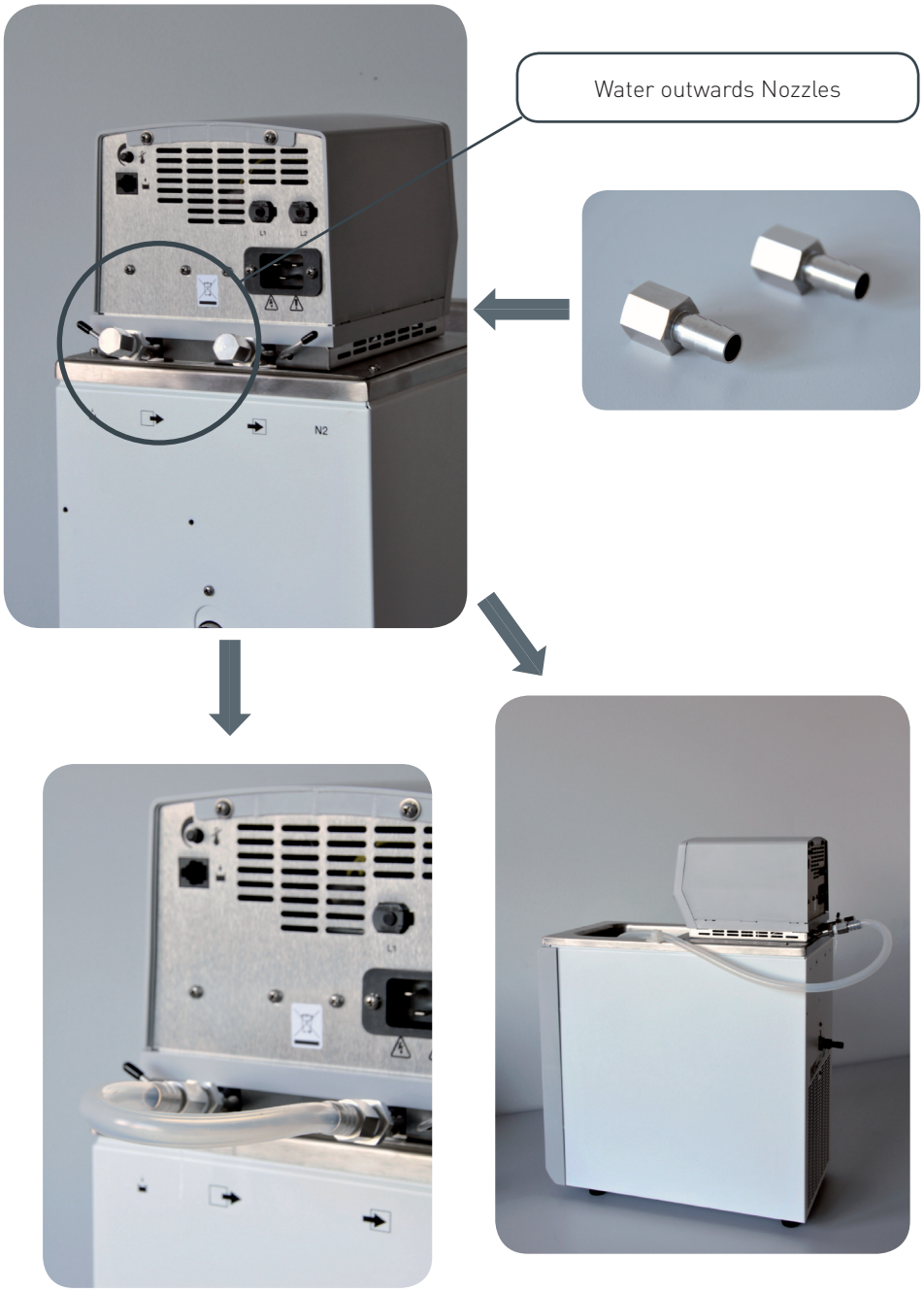
b) Connection to Bioruptor® Twin: two waterbathes.



## Cool Water Device Installation (cat# BioAcc-Cool)

Read carefully Installation manual from Cool Device and perform as mentioned.

**Note:**
Some kind of Water Reservoir Chillers (as so-called "Cold Bath Circulators") include pumps, they might not be appropriate for your use. Switch them off if possible. If there is no switch off selection: water flow has to be turned into a continuous loop by any means. See pictures below as examples:



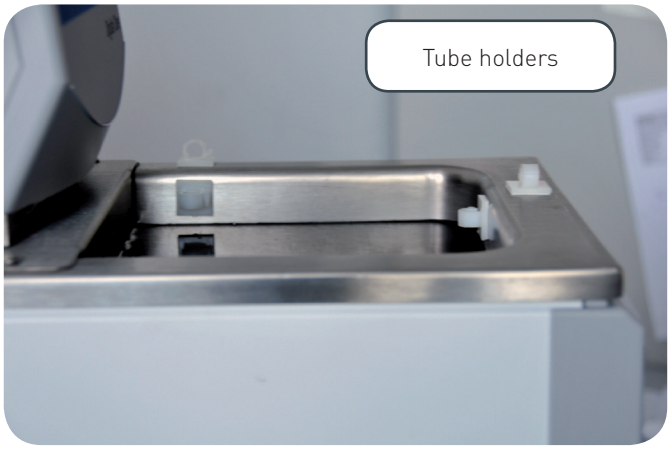

Use spare Tubing (8mm I D x 12mm O D) to set a continuous loop up.

## Pump Device Installation (cat# TWi-PUMP)

Two pumps per apparatus: one is dedicated to the water flow going from the Water Reservoir Chiller to the Sonication Water Bath (called "cold flow"), the other one is dedicated to the water flow going from the sonication water bath to the chiller water bath (called "warm flow").

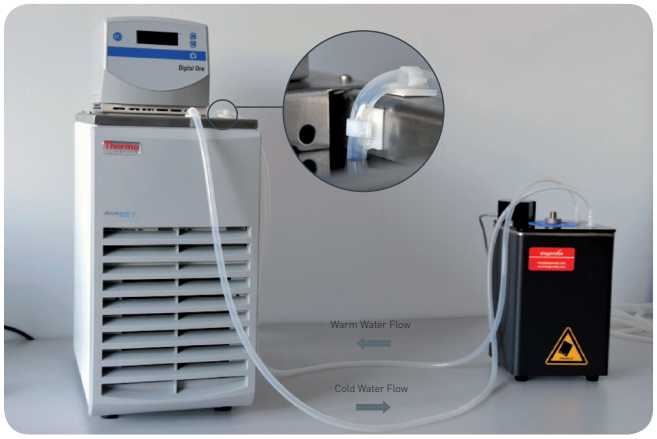
- Cut 2 pieces of silicon tubing: one for each flow. Cut them long enough especially if using the soundproof box.

- Glue four tube holders on chiller water reservoir. Two for the warm flow and two for the cold flow as shown on pictures. Warm flow pipe must discharge close to the cooling coil from the chiller water reservoir. Cold flow must draw water far away from the warm flow pipe discharge. This is to prevent the cold flow pipe drawing warm water.


At least, two plastic holders per pipe are required to fix appropriately the pipe because it moves constantly due to peristaltic pump head movement.

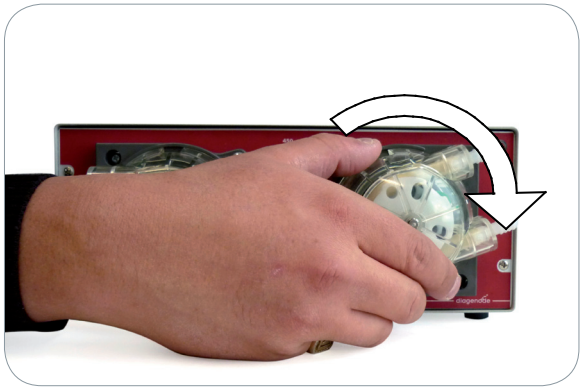
Before gluing plastic tube holders, make sure the surface is perfectly dry, otherwise it does not glue. Gluing them while the reservoir is completely unfilled and dry is advised.

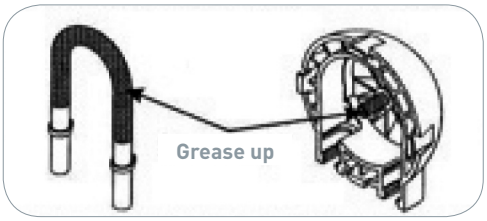


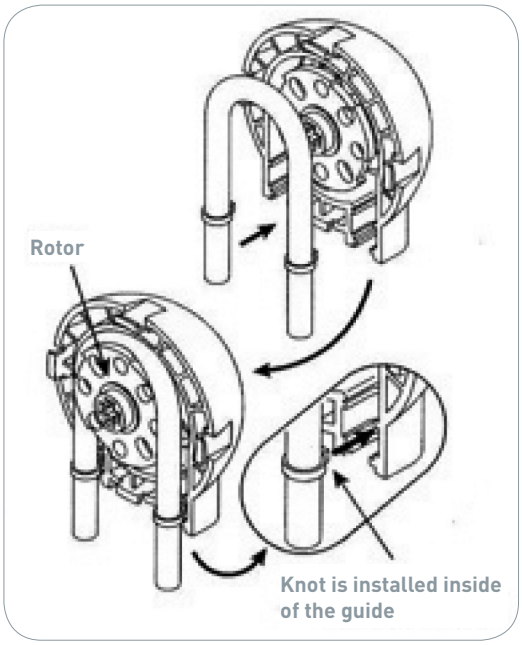

**Note:** submerge the pipe into the cold water reservoir, the end of the pipe must be one cm above the bottom of the tank.

Check the pipe in order to prevent any squeezed bends as it could diminish flow proprieties.
Now, insert the 2 pipes into the 2 heads from the pump. Follow the below steps:

Put sturdy tubing in plastic cassette: turn each cassette counter of clockwise until they stops then pull them out. Add grease to the cassette shafts and the surface of new tubing. Put a piece of sturdy tubing in (between rotor and cassette as shown on picture below) Place back the cassette to the base. Do the same for the other pump head.






Cut with scissors the silicon tube standing for the warm and cold flow where you want to integrate the pump.

Then connect each silicon tube ending to the appropriate sturdy tube ending.

Watch direction of flow: each pump has a drawing side and a discharging side. Heads spin clockwise which means left nozzles are the discharging side and right ones are the drawing side. Have a look on the global scheme page 7 to make sure.

Place plastic pipe holders to fix pipes along.

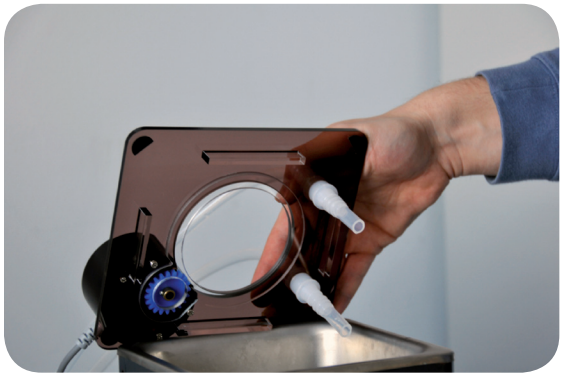
Concerning the upper lid of the Bioruptor's bath, set two plastic nozzles over the upper part of the sonication bath. Press firmly to ensure fixation.

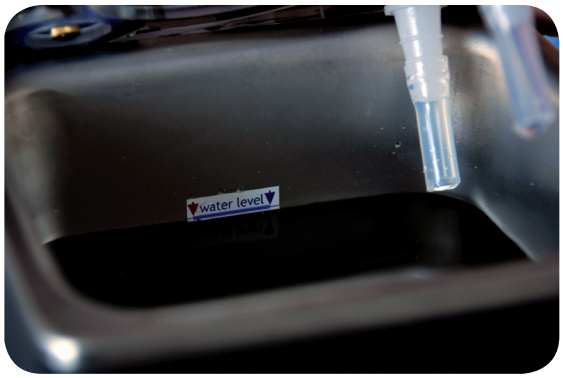
**Option 1:**

- Connect the warm flow pipe and the cold flow pipe from the sonication water reservoir to the chiller water reservoir.

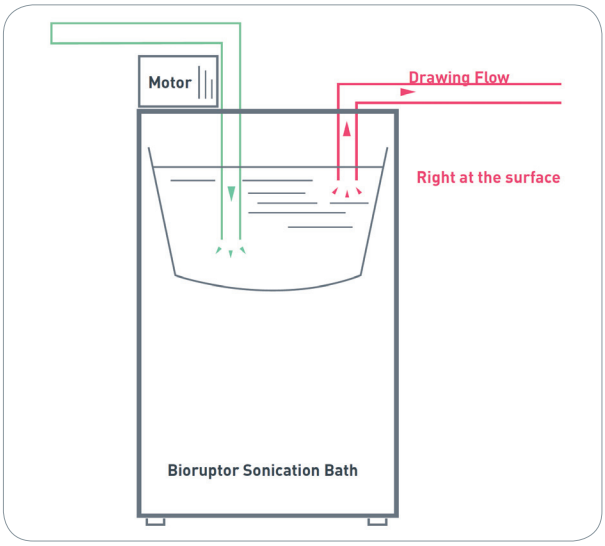

Connect a piece of silicone tube with the lower part of the connecting tool which is connected to warm flow. This piece of tubing will determine the level of water in the Bioruptor's tank as the circulator is "sucking" the water from this opening. This will be done later when the circulator is filled with water. The tubing can be cut gradually with a pair of scissors to allow a progressively higher level of water. The required level is determined by the blue line "water level") in the tank.

Connect a second piece of silicone tube with the lower part of the connecting tool which is connected to cold flow. Cut a piece long enough to allow the water flow going into the water.

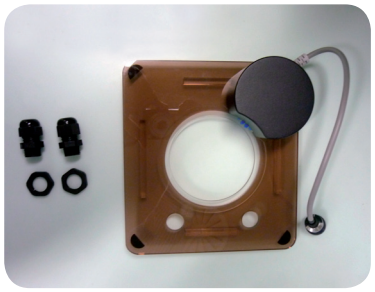


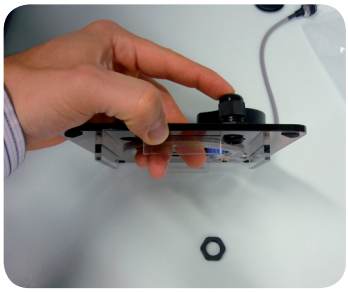


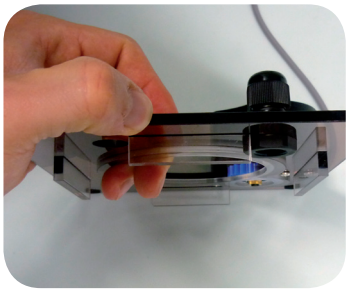

**For the connection of a second sonication watherbath (Bioruptor Twin) please proceed exactly the same way.**



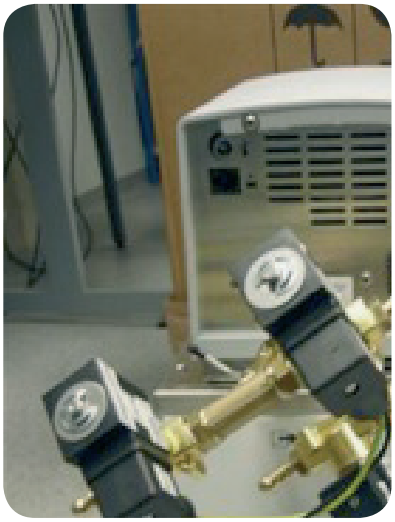

**Option 2:**
Place 2 black plastic connectors on the ***motor plate*** standing on the waterbath as shown on picture below.
Screw the plastic nut on the thread over the ***motor plate***.
Do it for both holes and set the motor plate on the top of the waterbath.

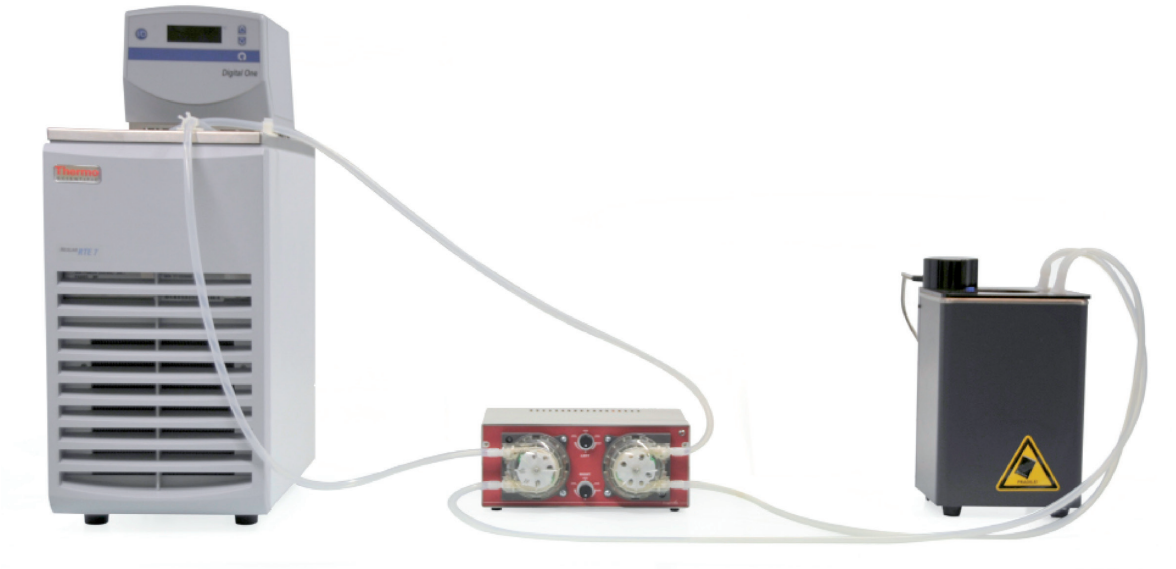






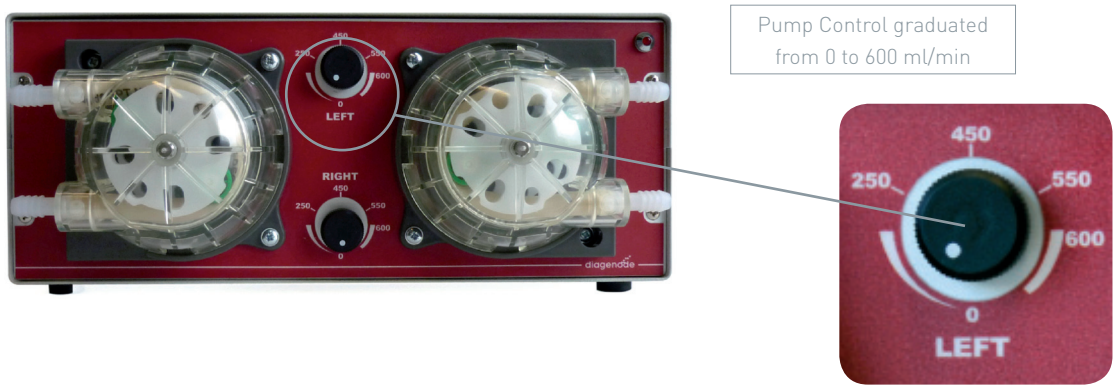
Then, connect the pipes to the ***Bioruptor waterbath***. Insert the silicon 6 x 9 mm pipes in the black plastic connectors.

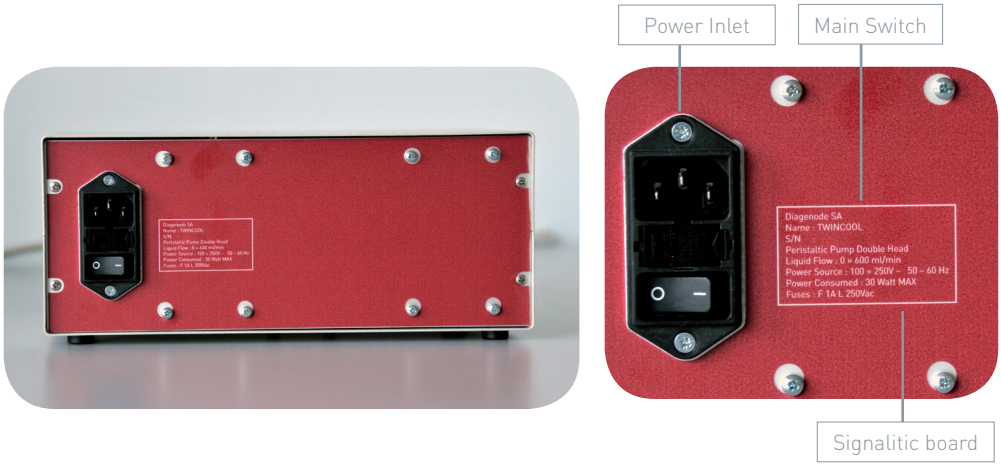




# Instructions for use

## Identification of Operating Controls




## Procedure for Setting

Start the cooling system; wait until the water is at expected temperature.
Consult cooling system's manual if necessary.

Rough water interferes in sonication phenomenon. Bioruptor's sonication bath does not allow water movement upper than 500 ml/min. Income water flow (cold flow) should be adjusted around 450 ml/ml. The back flow (warm flow) must be at least the same of the income flow.

**Note:**
The drawing flow cannot be lower than the discharging flow otherwise the volume of water in bath would increase upper to the limit. On the other hand, the warm flow is able to be higher than the cold flow because once the water upper the level is drawn, pumps will draw air which is not a problem.
Once the flows adjusted, you don't need to change them, just switch off the main switch.

# Equipment maintenance

**Note:**
Before starting maintenance work, turn the main switch off (beyond power connection) and secure the unit against being re-energized.

## Maintenance and Inspection

Replace hoses if you notice any leakage.

If you notice any abnormalities with the speed of flow, check it using a graduated beaker and a timer.

Fuse replacement:
Unlock the fuse drawer with a narrow blade screwdriver.

Info : F 1A L 250 Vac (Fuse reference)

## Storage

Pour water out of tubing and remove it off of pump mechanism when pumps will not be used for a long time. The tubing wall may be damaged if the rollers compress the same part of the tubing for a long time.

# Technical assistance

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## Ordering information

| Description | Cat. No. | Format |
|---|---|---|
| Bioruptor® Twin sonication device with 1.5 ml tube holder & new soundproof box | UCD-400 TM | 1 unit |
| Bioruptor® Twin sonication device with 1.5 & 15 ml tube holder & new soundproof box | UCD-400 TO | 1 unit |

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