

# Ionex A / B

## Waste Water Treatment Unit

### Operating Instructions



#### 1. Preface

The name IONEX stands for IONEX-changer, which is the very heart of this modern waste water treatment system. In total it consists of a two-stage filtration, two ion-exchange and one PH-levelling units. IONEX is ideally suited for all waste water cleaning processes in modern PCB prototype laboratories. The drain water quality from this system is in accordance to German directives, which are of the highest standards world

wide! The units exist in four variants with different sump capacities and ion exchange capacities.

#### Features

- Removal of solids and all heavy metals
- Decrease of chemical oxygen demand
- Easy handling and operation
- Regeneration of ion exchange resins by supplier or by user at little cost
- IONEX A and B perform additionally PH neutralization and discharge to the drain
- Loaded ion columns show significant change in color
- Built-in hose pump
- Polyethylene filter candle, 10 µm
- Lower and upper sump level control switch
- Storage sump for 110 (IONEX A) or 220 litres (IONEX B) of waste water

#### 2. Technical Data

	IONEX A (B)
<b>Dimensions (H x W x D):</b>	1400 x 425 x 600 mm (1400 x 850 x 600 mm)
<b>Weight:</b>	30 kg (60kg)
<b>Tank Capacity:</b>	max. 110 l (max. 220l)
<b>Cleaning Capacity:</b>	10 l/h (15l/h)
<b>Power Supply:</b>	230 V~, 50 Hz, 50 W
<b>Ion exchanger:</b>	2 x cation 1,5l ( 3l)
<b>Water in- and outlet:</b>	20 mm
<b>Consumption of neutralizing agent:</b>	Approx. 100 ml for 100 litre rinsing water
<b>Capacity:</b>	approx. 100 (200) Eurocards or 1000 (2000) pre-rinsed Eurocards

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#### 3. Safety

The following safety precautions should always be observed when handling chemicals (etching agent, acids, lies, etc.).

- Wear goggles and protective gloves for all work.
- If necessary only work under an extractor hood or at least in well ventilated rooms.
- Avoid contact with the skin, eyes and mucous membranes at all costs.
- Take off clothing soaked in caustic substances immediately.
- Rinse splashes on skin immediately with copious amounts of water.
- In the event of accidents or feeling unwell, always consult a doctor.

Only use the apparatus for its described application – that is treating diluted rinsing water. The unit is not suitable to treat concentrated solutions.

To avoid the risk of electric shock, do not remove the casing or open the back. There are no user serviceable parts inside. Leave servicing to the experts!

To prevent fire or the risk of electric shock, keep this unit out of the rain and away from moisture.

The lightning symbol with the arrow head inside an equilateral triangle means that there are live, uninsulated parts inside this unit that may give you a dangerous electric shock if touched.

The symbol with goggles and gloves indicate to all user that sufficient protection clothing and equipment is unalterable whilst working with chemicals.

#### 1. Instructions:

Read all the safety instructions and all the operating instructions thoroughly before using the unit for the first time. Keep these safety instructions and operating instructions somewhere safe in case you need to refer to them again in the future.

#### 2. Safety warnings:

In your own interest pay heed to all the safety warnings on the unit and in the operating instructions. Follow the instructions on operation and use of the unit in every respect.

#### 3. Ventilation:

Wherever you put the unit, always ensure there is sufficient ventilation.

For the etching and plating units in some circumstances an exhaust system is necessary. This mainly depends on the chemicals used.

#### 4. Effect of heat:

Do not put the unit anywhere near sources of heat, such as radiators, hot air shafts, oven etc..

#### 5. Power source:

Connect the unit only to the power source indicated in the operating instructions or on the unit.

#### 6. Protecting the flex:

Run the flex so that no one can step on it and nothing can rest on or against it. The flex is particularly at risk in the area of the plug, the socket and where it comes out of the unit.

#### 7. Cleaning:

Follow the manufacturer's recommendations for cleaning the unit.

#### 8. Unit not in use:

If you are not going to use the unit for some time, remove the plug from the socket.

#### 9. Foreign bodies:

Take great care to ensure that no liquids or other foreign bodies can find their way inside the unit through the openings in the casing.

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#### 10. Repair in the event of damage:

The unit should only be repaired by qualified personnel. Never try to do more in the way of maintenance to your unit than the operating instructions allow. Beyond that, always consult an expert for repair work.

#### 11. Setting up:

Set up apparatus only in a suitable room.

Apparatus filled with chemicals must be placed on chemical resistant floors.

In the case of overflow or leakage see safety data sheets. No chemicals are allowed untreated in the sewerage. In some case absorber tanks are necessary.

The use of the apparatus is not allowed in the residential area; keep away from children.

#### 4. Description of the process

The Ionex serves to treat rinsing waters from etching-, developing or pth-machines. We recommend to use ferric-III-chloride as etching agent.

The plant is made up of a storage tank, a peristaltic pump with a fluid level monitor and three treatment stages:

- Filter element
- Two ion exchanger columns
- Neutralisation chamber

The rinsing water from the etching and developing process is initially fed into the storage tank of the waste water treatment plant. The waste water is then fed by the peristaltic pump into the filter and then through the two ion exchanger columns into the neutralisation tank.

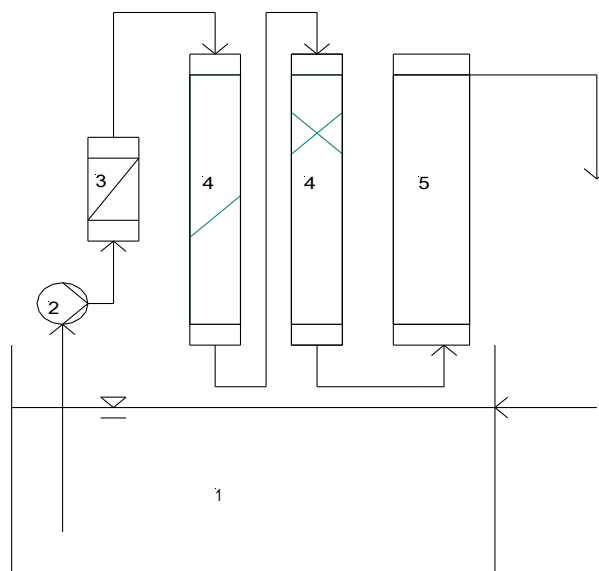
There are two solenoid switches in the storage tank. The lower solenoid switch automatically switches off the pump and air bubble when the tank is empty.

When the water level raises to the top the upper solenoid switch is activated. This switch is connected via relays to the cable coming out of the Ionex on the left side. If you want you can connect the power supply of an solenoid valve for example of your etching or through hole plating machine. If the water level triggers the upper switch the power of the valve is interrupted and the valve closes. Attention: this overflow protection works only with the Ionex switched on!!

If there is no solenoid valve in the existing system, a valve can be installed in the rinsing water feed.

The filter is used to retain suspended matter, which may be made up, for example, of photographic lacquer. Depending on how dirty the fluid is, the filter may have to be replaced or cleaned.

Loading



1. Tank
2. Pump
3. Filter
4. Ion- Exchanger
5. Neutralisation

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The waste water passes through the ion exchangers from top to bottom. The two columns containing the ion exchanger resin are connected in series.

The second column ensures on the one hand that the limit value for iron and copper is not exceeded and on the other the complete load can be applied to the first column. Assuming that per plate (European card format 100 x 160 mm), some 2 ml of etching solution is carried into the rinsing bath and the rinsing water consumption is 1 litre, then you can rinse approx. 100 boards (200 boards IONEX B), before you have to replace one column. If you rinse your boards first in a static rinse, leaving most ions in this rinse tank, the capacity of one column increases by factor 10 to 1000 boards (2000 boards IONEX B).

In the third phase of the treatment the waste water is automatically neutralised to the required pH value of 6.5 - 9.0. The air supply to the neutralisation column may be adjusted approximately. If the air rate is high the pH value in the out feed will rise. The adjustment screw is positioned on the rear panel.

The neutralisation agent, which is also used in drinking water treatment, must be refilled in batches. The filling level of the neutralisation agent may not be allowed to fall below

the mark. Depending on the pH value of the feed solution, consumption will be around 50 - 100 ml per 100 litres of feed water. It is not normally necessary to back rinse the neutralisation agent.

#### 5. Installation and commissioning

The unit must be installed horizontally to achieve an optimum flow through the plant. A spirit level may be used to check its position.

Electrical connection upper level contact Ionex: To avoid overflow of the Ionex tank connect the electrical contact of Ionex (cable on the left side) with the electromagnetic valve of e.g. the etching center. This is work for skilled staff only!

Then connect the water inlet of the IONEX to the rinse water outlet of your pcb machines and connect the outlet of the neutralisation column to the canalisation. Use appropriate tubes and fittings (fiber reinforced PVC tubes and hose clamps e.g.).

The plant is switched on by pressing the "On" light button. At the same time the fluid level system is activated. Pressing the „Pump“ switch activates the peristaltic and air pumps.

Fill the storage tank with rinsing water up to the mark.

The etching agent iron (III) chloride contains the metals iron and copper in ionogenic form. If the pH value is not adjusted to approximately 2, part of the metals will be precipitated in the form of hydroxide and will be retained in the filter. To reduce the hydroxide sump, you can lower the pH-value to 1.5-3 by adding approx. 0.5 to 1 litre of hydrochloric acid (approx. 10%) for 100 litres. The chemical is to be added whilst stirring the solution. If the pH value falls below 1.0, it may be corrected with diluted caustic soda (approx. 5%). The pH value may be measured with indicator paper or a pH meter. The chemicals will be totally mixed into the solution within thirty minutes. Open the ventilation screw on the head of the ion exchanger columns.

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Turn on the main switch.

Switch on the pump - whilst the first column is being filled, waste water will escape through the ventilation line and is fed back into the storage tank. The ventilation screw can now be closed to ensure that the column is completely filled. The second ion exchanger column is to be filled in the same way. If in the beginning air is collecting at the top of the column, you can evacuate this air by carefully opening the ventilation screw. The ventilation screw must not be completely removed to prevent the fluid spraying out.

#### 6. Maintenance

Before any maintenance work switch off the unit and put on protective gloves, clothing and goggles.

You will have to turn off the entire unit only while it is not in use. Further intervention is only required to a) check the column load, b) check the amount of neutralizing agent and c) occasionally check the pH in the storage tank so that no formation of residues can take place that would block the filter unintentionally.

The ion exchanger is to be replaced when the resin in the first column is completely discoloured and approximately one-third of the resin in the second column is discoloured. The iron content or copper content in the out feed water may be tested using test rods. Indicator paper or a pH meter is to be used to measure the pH value. The pH value of the water must be between 6.5 and 9 whilst the copper concentration must be < 0.5 mg per litre and the iron content < 3 mg per litre.

The level of the neutralisation agent must be between the minimum and maximum marks. If heavy metals get into the plant as a result of its being operated incorrectly, the agent will be badly discoloured and may have to be replaced.

#### To replace the ion exchanger column:

First open the ventilation screws on both columns.

To empty and replace the columns - first of all undo the sealing cap at the end of the column so that the fluid can drain out of the column. The column can now be lifted and sealed with the appropriate sealing caps. Now pack the column in the prefabricated box and send them to us. Replace the first column with the second column and place a third regenerated column in the second position.

On request we can also send you instructions for regenerating the columns yourself.

#### To replace the filter:

As the filter becomes more and more blocked with dirt the volume flow will fall. Before removing the filter, the ventilation screw on the filter and on the ion exchanger columns must be opened. Undo the screw union and insert a new or cleaned filter. The sealing ring must be free of faults and clean.

#### To replace the pump hose

The hose has been selected to meet the chemical resistance requirements. Its service life is 1,100 hours according to the manufacturer. This value may vary considerably from the manufacturer's figure depending on the speed of the pump, the age of the hose, etc. If you have to exchange the hose we can send you a short instruction.

#### 7. Cleaning

The wastewater treatment plant is made of PVC. Tap water can be used to rinse out the plant. Bad areas of dirt (for example, baked on dirt) can be cleaned off using diluted acid (e.g. hydrochloric acid or sulphuric acid).



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#### 8. Guarantee

All machines are submitted before distribution to examination on function and continuous operation firmness. On the machine we grant a work warranty of 12 months to our customers starting from purchase date on accuracy in material and processing. We warrant at our choice by exchange of incorrect parts or by repair of the machine in our house. Old parts change into our possession.

#### 9. Disclaimer of Warranty

All parts subjected to wear are excluded from this warranty. Non-observance of this manual shall void all warranty claims.

We cannot accept subsequent claims from damage or destruction of workpieces worked on in the machine, because we have no knowledge or control over the operating conditions at your site. This is valid in a general manner also for requirements from damage to articles, buildings and persons as well as the environment.

We do not warrant that the function of the machine will meet the customer's requirements or that the operation of the machine will to this regard be error free.

In no event will we be liable to the customer for any incidental, consequential, or indirect damages of any kind, including loss of profit and prosecution for environmental pollution, even if we could have been aware of the possibility of such damages.

All information was arranged with great care. We reserve ourselves however mistake and technical changes without previous announcement.

Running the machine in corroding, humid, dusty, extremely hot or explosive atmosphere happens at the operator's own risk and responsibility.

We explicitly exclude any warranty for damages resulting from running the machine in in corroding, humid, dusty, extremely hot or explosive atmosphere.

#### 10. Copyright

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