

# IONEX KB (500-260)

## Operating Instructions

### Waste Water Treatment Unit

#### Principles of Operation

IONEX will absorb any type of heavy metal. The main field of application for this unit, though, is cleaning rinse water from etching with ferric chloride and from galvanic PTH.

The unit is made up of a storage tank with a level monitor, a peristaltic pump, a filter element, and three ion exchange columns.

The rinse water from the etching process is initially fed into the storage tank. The peristaltic pump in the unit will then feed it through the filter and the three ion exchange columns. The water exiting from the unit can be considered as de-mineralised water that will go back into the rinse cycle.

There is a floating solenoid switch in the storage tank. The solenoid switch automatically switches off the pump when the tank is empty. To prevent overflow, the unit offers a relay contact that can be used to shut a solenoid valve or a rinse water pump when the maximum filling level of IONEX has been reached.

If there is no solenoid valve in the existing etching machine, such valve should be installed to the rinse water inlet.

The filter is used to retain suspended matter. Such matter will appear mostly if the pH value of the liquid is higher than 2, since the metal ions will then collimate in the form of hydroxides. The filter may have to be replaced or cleaned periodically.

The waste water passes through the ion exchange columns from top to bottom. The three columns are connected in series. The first column contains the metal-absorbing exchange resin, the two others are filled with anion exchange resin, taking up the non-metal ions.

When the conductivity of the cleaned water rises or its pH value becomes low, the columns need regeneration. This is a service we offer you.

The load level of the first column is indicated by a change of the resin colour from beige to brown or blue. The part of the filling taking such colour must not reach the lower end of the column, else there will be metal ions passing without neutralisation.

Assuming that some 2 ml of etching solution are carried into the rinse unit for each board of 100 x 160 mm, and the rinse water consumption is 1 litre, the column has a capacity of about 200 of such boards.

If the boards pass one extra closed-loop rinse unit before going in the final rinse. and if only the water from the final rinse will be treated by IONEX, the capacity of one column will increase to approx. 2000 of such boards.

#### Installation

Initially, you may want to establish the electrical connection to the etching machine or rinsing unit so that the IONEX level switch can inhibit any excessive water input. See page 5 for further reference.

The unit must be levelled horizontally to achieve an optimum flow through the unit. The hose for the rinse water outlet from the etching system is then connected to the storage tank on the IONEX. A water outlet hose will connect the last ion exchange column to a recycled rinse water storage tank. Fill the storage tank with approx. 30 litres of rinse water. Set the pH value to 1.5 - 2. To reduce the pH value of 100 litres, approx. 0.5 to 1 litre of hydrochloric acid (approx. 10% conc.) is required. 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 unit is switched "ON" by the left button. This will also activate the fluid level system. The peristaltic pump is activated by pressing the "PUMP" switch.

Open the ventilation screw on the head of the ion exchanger columns. Turn on the main switch. Switch on the pump. While the first column is being filled, waste water will escape through the ventilation overflow hose and will return into the storage tank.

Close the ventilation screw as soon as the column is entirely filled. Repeat this operation for the second and third column. The ventilation screws must not be removed completely in order to avoid the liquid spraying out.

Have the pump fill the third column until the liquid has mounted to the drain outlet. The unit is now ready for use.

#### Operation

With water from the etching machine or rinse module flowing into the storage tank, the level will rise and the level switch will turn on the peristaltic pump. This will continue cleaning the water from the storage tank until the level is low. You will have to turn off the entire unit only while it is not in use. Further intervention is only required to

1. Check the column load,

- b) Check the pH or conductivity of the clean water

- c) Occasionally check the pH in the storage tank so that no formation of residues can take place that would block the filter unintentionally.

#### Replacing the columns

**The unit must be switched off prior to any maintenance operation!**

**Always wear protective gloves, clothing and goggles !**

The load of the first ion exchange columns is determined by a change of colour to brown (from ferric ions) or blue (from copper ions). It is to be replaced prior to reaching a 100% load. The two anion exchange columns do not show a change in colour, but their load will monitor in a decreasing pH or increasing conductivity of the cleaned water.

The pH of the drain water must be between 6.5 and 9 whilst the copper concentration must be less than 0.5 mg per litre and the iron content less than 3 mg per litre. These limits correspond to German waste water regulations and may be different in your country.

To remove the columns, open the ventilation screws on top. Open the small valve beneath each column so that the liquid can drain out. Unscrew the big grey flange screws and remove the column from the unit. Use the enclosed cover screws -63mm dia. to seal the column for transport.

Replace the columns with freshly regenerated ones. Close the little drain valve and do the ventilation like indicated above.

Depending on the distance to us and on the intensity of use, you may choose to either send the columns for regeneration or to do this regeneration by yourself. For the latter purpose, we enclose a diagram on the last page.

Although it is somehow contrary to the intention of an active re-cycling of heavy metals, a third way of handling would be to discharge the loaded resin as a special waste, equivalent to the used ferric chloride from the etching process. This procedure can even be considered environmental friendly if you count the consumption of energy for sending the columns back and forth.

#### Replacing the filter

The extent of load to the filter becomes visible in the filter housing and will decrease the flow volume of the pump. Prior to removing the filter, the ventilation screw on the filter and on the ion exchange columns must be opened. Undo the screw union and insert a new or cleaned filter. The sealing ring must be clean and without damage.

### Replacing the pump hose

The cover on the pump must be removed by undoing the two PVC screws. The hose bed can then be removed. To do this remove the two countersunk Allan screws. First pull in axial direction so that the pins that position the hose bed become loose. The hose passage with the hose can now be removed. The hose is secured with short sections of tube. Insert a new hose and assemble the pump in reverse order

The hose has been selected to meet the chemical resistance requirements. The manufacturer indicates a MTBF of 1000 hours, but this value may vary considerably depending on the actual conditions of operation.

### Cleaning and other maintenance

The unit is made of PVC. Tap water can be used to rinse it. Residues that will not dilute in water can mostly be removed by assistance of diluted hydrochloric or sulphuric acid.

### Safety precautions

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

- Wear goggles and protective gloves for all work.
- Assure good ventilation to the working place
- Strictly avoid contact with the skin, eyes and mucous membranes.
- Immediately take off any clothing that was contaminated by caustic substances.
- Rinse splashes on skin immediately with plenty of water.
- In the event of accident or feeling unwell, seek medical advice.

### Technical data

#### Dimensions

(H x D x W) 1580 x 860 x 570 mm

Weight: 30 kg

Tank capacity 200l

Supply: 230V, 50 Hz, 50W

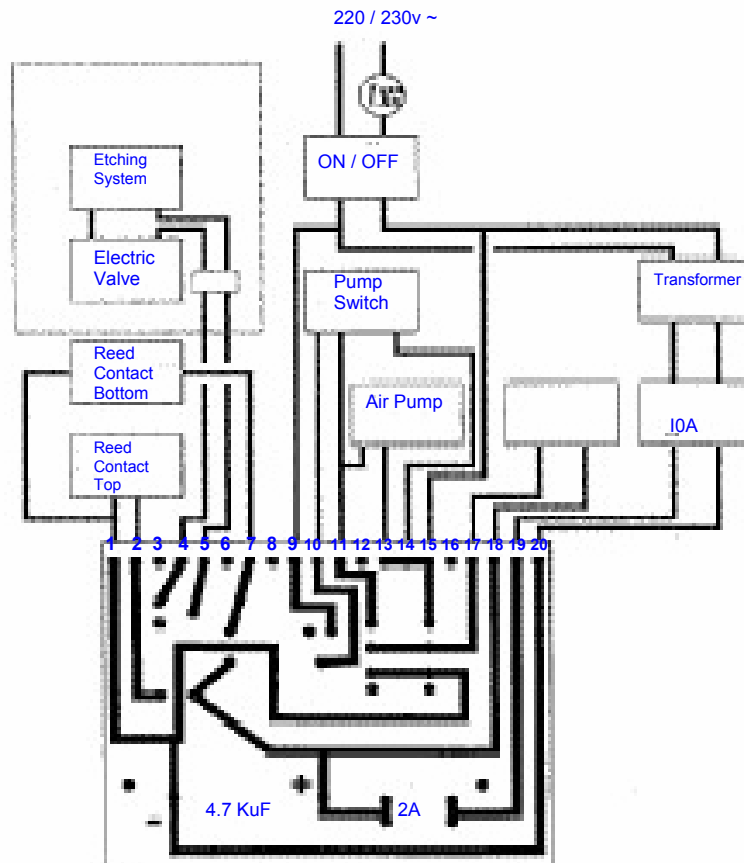
Flow rate: 15 l/h

Filter: PE cartridge

### Electrical circuit diagram

To prevent the storage tank from overflow, the electric valve on the rinse unit can be connected as shown on the circuit diagram. A relay contact will open when the storage tank is filled. The electrical connection is done to the cable coming from the side of the control section.

To open the control section, the cover on the rear must be removed. Insert a screwdriver into the groove on the lower end of the cover plate. Lift the plate over the edge of the box and then push it downwards.



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