



**MICRONIX<sup>®</sup> EDI**

**TECHNICAL MANUAL**



**MICRONIX WATER TREATMENT TECHNOLOGY CO.,LTD.**

Personal safety precautions



Electrical

EDI equipment and local controller is charged, so in the work equipment controller internal operating EDI, should guarantee system power was closed.

Electrical should be used the following guarantee:

- 1, regular check each terminal blocks, ensure reliable connection wiring firm.
- 2, timely repair or replace the performance is electrical components.
- 3, check the sealing performance, ensure external water droplets not be entered
- 4, deal with electrical fault or replace the electrical components, must by professional electrical personnel.
- 5, system in working status, it is not allowed to remove the power cord.
- 6, system device must have a good grounding protection.

Machinery, tools should be used the following guarantee:

Because EDI stack for the charged components, can happen to get an electric shock risk, so there is no such as tool, bolts and nuts metal sundry placed in EDI stack of it.

Nonprofessional maintenance personnel do not adjust stack of both ends of the bolt.

If a stack of ooze water or leakage occurred, should be stopped, and notify the equipment running professional maintenance personnel check processing.

This device can not be operated by the personnel without training or any operation experience. Before use, please read and fully understand the content and after the manual related training, otherwise can't operate the EDI equipment. For the damage caused by the personnel operating not in comply to this manual, the company does not undertake any responsibility.

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## I , company profile

### Micronix water treatment technology Co., LTD profile

Micronix water treatment Technology Company is a Sino-foreign joint venture of the joint stock limited liability company. Integrating production and manufacturing and research development as a whole, the development of an independent intellectual property rights of the patent products: packed bed electro dialysis (EDI) stack.

EDI is a revolutionary significance of water treatment technology; it combines electro dialysis with ion exchange technology combined. Use this technique cannot acid and alkali regeneration for making high quality ultra pure water. It is the emergence of the water treatment technology of a leap, marked the water treatment industry eventually entered into the green industry ranks. Using EDI technology manufacturing ultra pure water is the future development of the new trend in water treatment.

Micronix Company with domestic rich technology human resources and strong foreign funds based on the background successfully developed new EDI stack. The stack with the same kind of products, which was compared with salt, cannot run continuously, also produce a water yield of power consumption for smaller etc. Characteristics. Compared with the similar foreign products, the unit water production energy consumption fell about 30%. Accord with energy saving and reduce energy consumption trend.

Companies adhering to the "research and development, development and innovation spirit" and "pursuit of one hundred percent customer satisfaction" service policy, in 2003 passed the ISO9001:2000 quality system certification, the company management and working quality more on a new step.

II Micronix since its founding, the company always adheres to the technology, professional development strategy, to EDI product technical innovation and improves the quality. The company has the first-class research and development, production and technical service team and dedicated to provide you with quality products and quality service.

### II , Micronix (MICRONIX™) product features II and performance specifications



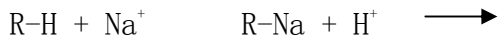
### 2.1, Micronix EDI stack profile

Micronix water treatment technology Co., LTD. Independent development has its own intellectual property MX series EDI stack, comprehensive electro dialysis technology and ion exchange will combine technologies, the use of anion and cation exchange membrane, ion exchange resin, weak, concentrate water separation chamber components and other parts work units, according to produce a water flow assemble various types of stack, in

direct current field to realize the driver and water purification, the effective desalination rate can amount to 99.9%, the actual operation, safe and reliable, water quality, water production stable continuous production up to 15-18 Mohm.cm above the ultra pure water.

EDI -Electro Deionizer for the abbreviations

EDI stack of removing the water through the built-in ion is ion exchange resin. Its application is as follows: (the  $\text{Na}^+$  representatives to cation, to  $\text{Cl}^-$  represents anion)



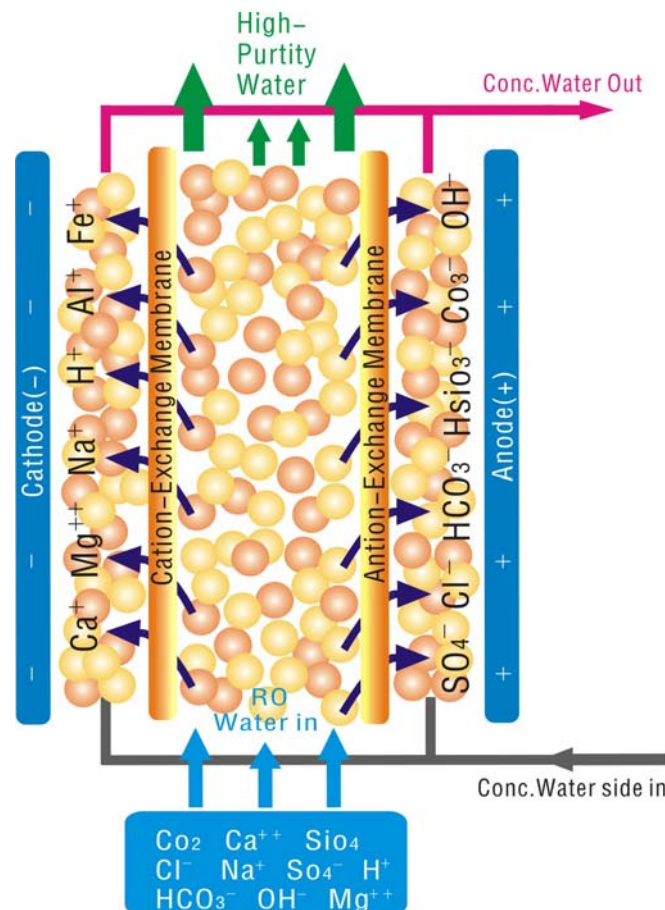
Because of the EDI stack ion exchange resin filling capacity of the limit, ion exchange resin in use after period of time will gradually saturated, so ion exchange resin regeneration rear can continue to use should be.

EDI stack by several concentrated water is room, dilute water room combination unit composed of superposition. Dilute water room-by in the anion and cation exchange resin, mixed between diaphragms filled to produce pure water work sandwich for pure water room said

Concentrated water room-two pure water room between connected by anion and cation exchange of membrane, to collect strong water work sandwich called concentrated water room

Electricity plate-used in stack in the operation of the electric field of produce the electricity is shown, called role input armature plate. Usually divided into positive and negative, located in the stack ends of the piece.

EDI working principle as shown in figure. EDI stack was separated concentrated water room and dilute water room of the appropriate number case board, forming and Dilute water room. And set a cathode /anode electrode extremely at both ends. In dc, driven by the water by dilute water room ion of cathode and anode through cathode and anode respectively ion exchange membrane migration to concentrated water room and in dilute water chamber removed. The following figure:



The molecule of water in the electric field in ion exchange resin interface dissociated into  $H^+$  and  $OH^-$  and continuously regeneration of dilute water room anion and cation exchange resin. Ion exchange resin of anion and cation is attracted to positive and negative electrode in the regeneration process, the corresponding moved by cation, anion exchange resin corresponding to the ionic membrane direction migration. When these ions through exchange membrane into the concentrated room,  $H^+$  and  $OH^-$  to combine into the water. This kind of  $H^+$  and  $OH^-$  generation, annihilating and anion and cation migration is the ion exchange resin can be realized the mechanism of continuous regeneration.

## 2.2, Micronix EDI stack of characteristics

EDI in traditional water treatment system can replace the existing in the mixed bed, it can steadily continuously making high purity of water. The biggest advantage is that need not EDI chemical reagents regeneration, therefore we do not need to chemical regeneration elixir storage tank and the corresponding neutralization pool, and not be harmful chemical wastewater by collection, storage and processing. EDI systems can great simplified configuration and venues.

RO is applied to reduce field the requirements of large equipment, EDI technology application is also fully comply with it. Because EDI system can be on the basis of field real situation adaptation, ensure equipment factory design combination room without high tank (mixed bed) exists. In the requirements of complete sets of equipment can quickly installation up and put into operation in the membrane law system, the equipment in this is very important in advantage.

There is a characteristic is the concentrated water discharge, EDI containing only inlet water the impurity composition, usually the kind of water quality of the raw water into water than pretreatment system in the water quality, so concentrated is better water can consider directly sent to the recycling of raw water into the nozzle, RO so effectively eliminated the wastewater discharge. Instead, the regeneration of the mixed bed is a one-time process, because use chemicals regeneration ion exchange resin bed, the waste water containing than general EDI concentrated high 3-4 times, this kind of waste liquid waste ion usually not recycled to the pretreatment system, but in the waste water discharge and in the pool.

EDI of operation is continuous, its production of water quality stable, it does not look like the mixed bed in each of the regeneration cycle starts and end the leak and influence for ion effluent water. This continuous operation mode of operation is simplified; no need to consider setting for regeneration work needs to adjust the relevant equipment operators and operating procedures.

Sums up the following key points

Continuous manufacture pure water, and work continuous operation

Need not add salt system

Don't need acid, alkali chemical reagent to the resin regeneration

High efficiency, waste water to recycled

Stable discharging water

To achieve the combination of stack to water making capacity requirements

Low operating cost, accord with environmental protection requirement

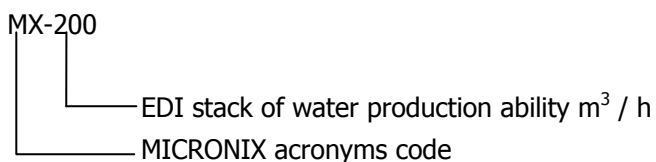
EDI application fields

- ⊙ power plant chemical water treatment
- ⊙ electronic, semiconductor industry ultra pure water
- ⊙ precision machinery industry ultra pure water
- ⊙ pharmaceutical industry process water
- ⊙ laboratory research with pure water

- ⊙ fine chemical, top discipline water
- ⊙ other industry for high pure water preparation

### 2.3, Micronix EDI stack of naming and Numbers rules

MICRONIX™ is Micronix water treatment technology Co., LTD. Registered trademark, the use of its Numbers rules are as follows:



### 2.4, Micronix EDI stack of specifications and performance

Stack of product specifications and performance

Model and specification	Flux Rate (m <sup>3</sup> /h)	recovery rate (%)	Water production resistivity (MΩ .cm)	voltage (DCV)	current (DCA)	Shape dimension (long × high x width)
MX-50	0.3-0.75	75-85	15-18	0-200	≤5	310×680×310
MX-100	0.8-1.4	85-90	15-18	0-330	≤5	395×680×310
MX-200	1.5-2.4	90-95	15-18	0-330	≤5	580×680×310
MX-300	2.5-4.4	90-95	15-18	0-330	≤5	705×680×310

## III, EDI technology and the basic system design

### 3.1, EDI feed water conditions

Source water: (pass two) reverse osmosis RO water production, conductivity 1-15 μs/cm, the maximum less than conductivity 25 μs/cm

PH: 7.5-9.0 (pH7.0-8.0 can be best resistance between EDI frivility can)

temperature: 15 °C -35 °C, (EDI best temperature in 25 °C)

Feed water pressure (D<sub>IN</sub>): 0.15 0.45 MPa

Inlet concentrated water pressure (C<sub>IN</sub>): the low pressure than D<sub>IN</sub> 0.06-0.15 MPa (must)

Water production pressure (D<sub>OUT</sub>): 0.05 0.25 MPa

Concentrated water outlet pressure (C<sub>OUT</sub>): the low pressure than D<sub>OUT</sub> 0.05-0.13 MPa (must)

Feed water hardness: < 0.5 ppm (calcium carbonate plan)

Feed organic matter: TOC < 0.5 ppm

Feed oxidant: Cl<sub>2</sub> (activity) < 0.03 ppm, O<sub>3</sub> (ozone) < 0.02 ppm, HO. (hydroxyl oxygen) < 0.02 ppm

Feed Water heavy metal ions: F<sub>e</sub>, M<sub>n</sub>, of variable valences metal ions < 0.01 PPM

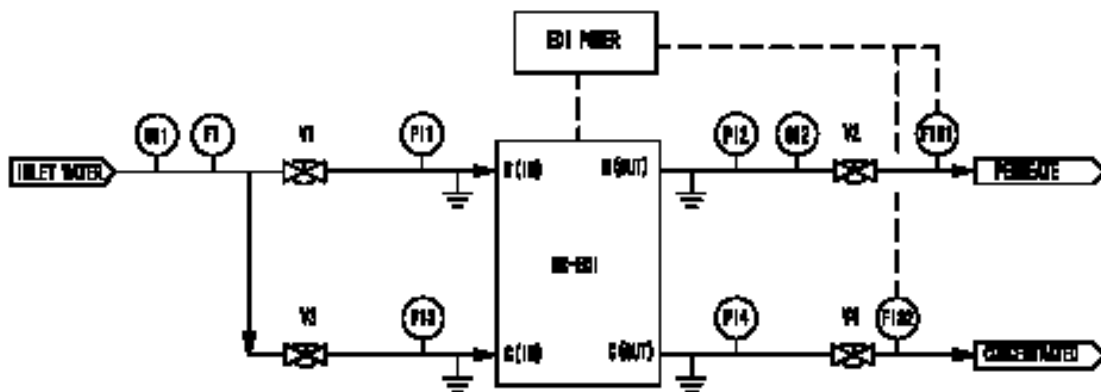
Feed silicon: SiO<sub>2</sub> < 0.5 ppm (reverse osmosis RO water production typical range is 50-150 ppb)

Feed the total CO<sub>2</sub>: < 3 ppm

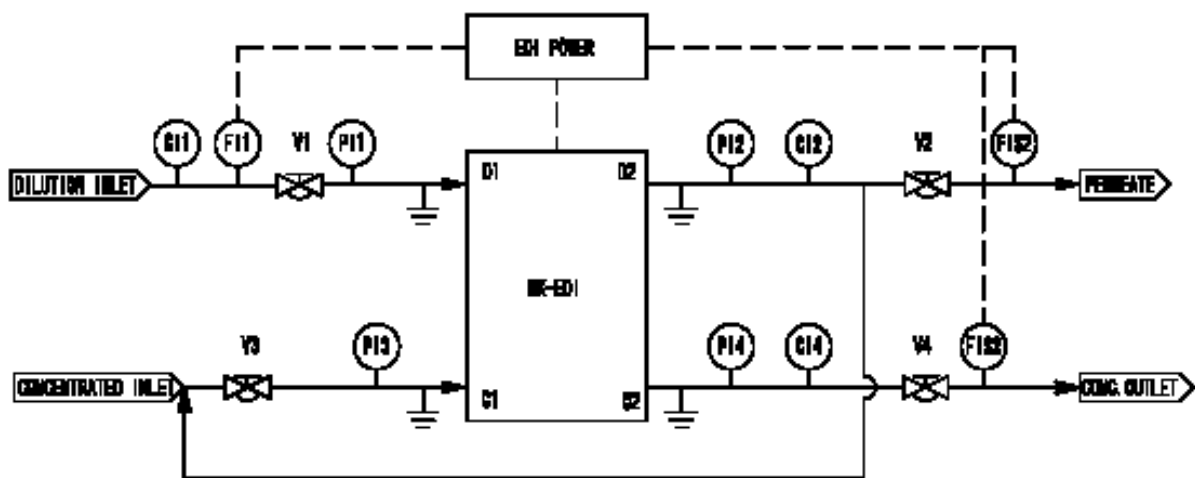
Feed water particle: < 1 μm

The basic process flow diagram:

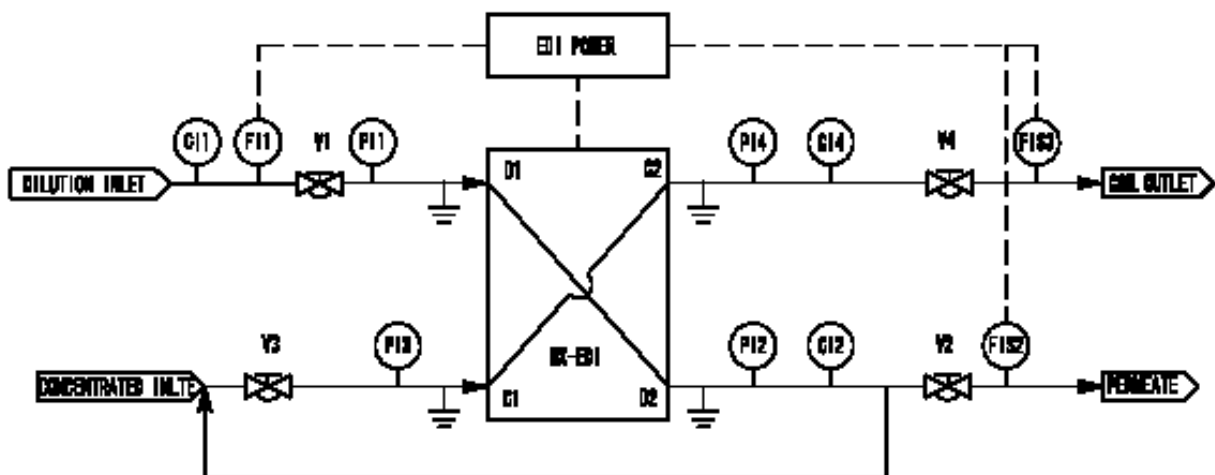
Scheme i (traditional pass two reverse osmosis water production)



Scheme ii (recommended)



Scheme iii (recommended)



Scheme ii and iii through a long run, proved to be a preferably process, can make the equipment operation is stable and regeneration cycle extended etc. Characteristics.

Figure that symbols:

D1-dilution water inlet

C1-concentrate water inlet  
D2-water production an outlet  
C2-concentrate water vent

### 3.2, Basic system design

To ensure a good EDI system equipment operation is stable, and the product water quality, reasonable integral of water treatment system design is not the neglect.

System design factors include:

Inlet water of EDI pretreatment system (guarantee feed water conditions)

The intelligent system protection and control

Equipment easier to operate and data to read

System requirements of at least a stack

System security design

#### 3.2.1, Inlet water of EDI pretreatment system

At present the pretreatment of the EDI systems around application solutions to emerge in endlessly, below is some of the system now conventional treatment scheme.

1, pass two RO process (main component)

Tap water + water tank + water pump + media filters + activated carbon filter + water tank +

raw water pump + micro filter + first RO high-pressure pump + first reverse osmosis +

sec. RO high-pressure pump + sec. reverse osmosis + water tank + feed pump + EDI

Process features:

Pass two RO systems: through the pass two RO scheme technology processing, can fully meet the EDI equipment the requirements of the water conditions. EDI system can be stable and long-term operation.

Key points: can in first RO water to second RO high-pressure pump water dosing  $\text{NaOH}$  between, adjust the pH value (7-9), will be first RO water  $\text{CO}_2$  change into  $\text{HCO}_3^-$  ions, through the secondary RO removed.

Suitable for: raw water turbidity, hardness, alkalinity and residual chlorine, electric conductivity parameter index is on the high side

Replaceable units: system many medium filters can be used to replace UF filter equipment

2, one stage RO process (main component)

Tap water + water tank + water pump + medium filter + carbon filter + softener +

Water tank + Water pump + micro filter + high pressure pump + reverse osmosis +

Water tank + water pump + degas membrane + EDI

Process features:

Softener: through the softening process, solve the water hardness requirement of EDI, deficiency is softener needs regular regeneration

One stage RO: through the RO scheme technology processing, in addition to CO<sub>2</sub>, other basic requirements is meeting into conditions of EDI equipment. EDI system can run.

Key points: due to the one stage RO can't completely water to remove CO<sub>2</sub>, leading to the CO<sub>2</sub> into water equipment EDI exceed bid, so should be used to take off gas membrane device will remove CO<sub>2</sub>, ensure EDI water qualify. Water

Suitable for: raw water turbidity, hardness, alkalinity and residual chlorine, electric conductivity parameter index is not high, and the water quality is stable.

Replaceable units: system many medium filters can be used to replace UF filter equipment

A good EDI the structure of the system, the main one is the part dealing with before in the design to be to consider the greatest possible meet the above conditions, the recommended water EDI two scheme of the main equipment configuration of its function as follows:

Many media filter: remove the water, colloid particles suspended, the impurities such as water, make turbidity of less than 1, SDI ≤ 4. Ensure RO not unclean plugging these impurities

Activated carbon filter: remove the water activity of the residual chlorine and some oxide, and organic substances and etc, protect the reverse osmosis membrane, ion exchange resin and ionic membrane not oxidation degradation.

Softener: remove the water part of Ca, Mg ions, reduce the water hardness, prevent RO, EDI equipment in the membrane element scaling and cause pollution plugging, leading to component failure.

### 3.2.2, the system of intelligent protection and control

In addition to the reasonable combination of design, the overall EDI good electrical control is also cannot be ignored, and as the EDI stack the main job of a piece of by the role of the electric field to implement ion exchange resin regeneration and, thus in the design of the input of stack to consider the current, voltage there is a limit to, and can be system controller shut off. In order to protect the EDI stack, power supply input should be of any of the flow of stack EDI below the set of automatic shutoff (we can refer to the basic flow chart of the flow meter set position), also want to consider in water production resistance rates lower than process requirement, water production valve can switch to renewable state, and a warning lights display. The system designs to have conductivity/resistivity form a complete set.

### 3.2.3, system design of the device should be easy to operate and instrument to read

For the system's operation is convenient, easy to read, watch in the design to consider all sorts of valve operation, instrument disposition in easy operation side, pipe configuration should avoid unnecessary redundancy corner, each flow meters, pressure gauge have definite sign their function and data set. The conductivity meter, PLC, LCP (Local Control Panel), such as ark should be combined in a kit, and the control cabinet in the operation of the panel knob and/button position should be set up in the easy operation and observation of the place.

### 3.2.4 A system stack economic combination

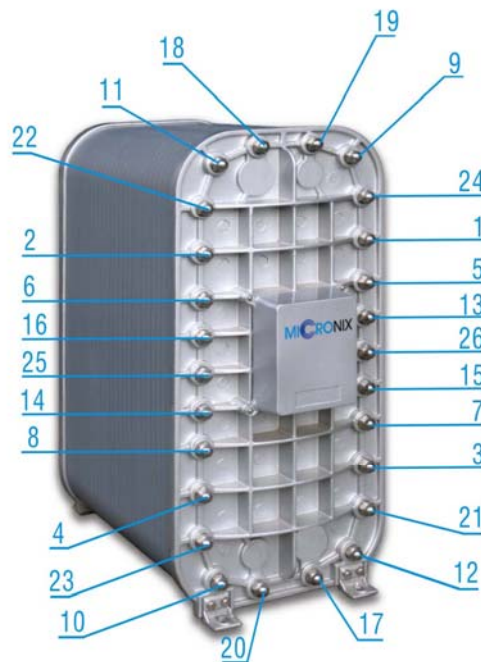
In system design, according to the specific user requirements and the equipment cost factors produce a water yield, combined with the performance parameters of stack, selecting the best stack of quantity combination.

### 3.2.5, system security design

EDI stack of external power terminal with, so in the junction box system design considerations of the insulation system ensure the safety of operators. All of the stack should be fixed in the frame, and with the metal frame have good contacts, rack must have the safety design grounding device.

Because water is conductivity, current can through the water conduct to frame, therefore, design also must in all inlet and outlet design has a "T" type grounding connecting point, through the ground fixed connected to the frame.

Stack leakage is not allowed, so, once this happens, must always stop check leakage reasons. Usually stack which is caused by leakage on both ends of the stack bolt looseness has caused by check again, and the bolt to solve the leak. General bolt tightness in accordance with the following the Numbers can be in order.



Bolts of torque to maintain high product water resistivity and prevent leakage is very important, if stack loose in addition to cause leakage, will be in concentrated water room cause salt crystals form jam. Prevent leakage is the responsibility of the user. The following circumstances should check and adjustment bolts of torque:

When the stack transportation arrived at their destination;

When the stack has been installed in the unit equipment combination on the frame;

When unit equipment freight on arrival at the site;

Users in the commissioning before operation;

When supply pressure is confirmed and applied after the;

In unit of the equipment operation first month's check every week until internal ionic membrane components was perfectly pressure;

The entire stack in the factory has been done to adjust and tighten. After installation and operation module in before, should according to the technical manual diagram to tighten bolts. Pay attention to the adjustment of the bolt fastening order is very important, reasonable tighten order can avoid ionic membrane components and ensure the distortion of the consistency of the internal pressure water.

The too big torque can lead to the any cell deformation, too small torque can produce leakage, and the right torque can be reference to the table below.

Bolts recommended list:

stack type	Recommend torque
MX-50	30N-m
MX-100	40N-m
MX-200	50N-m
MX-300	50N-m

### 3.2.6, system design common calculation formula

Recovery:

The recovery in the value of the water hardness set and decides

Water hardness (ppm to CaCO <sub>3</sub> count)	Recommend recovery
0.0—0.10	90-95%
0.10—0.50	75-85%

$$\text{Recovery} = \frac{\text{Flux Rate}}{\text{Production flow} + \text{concentrate flow of water}} \times 100\% \quad (\text{flow unit m}^3 / \text{h})$$

Note: reduce recovery can reduce the water side of concentrate hardness value, so as to reduce the possibility of scaling

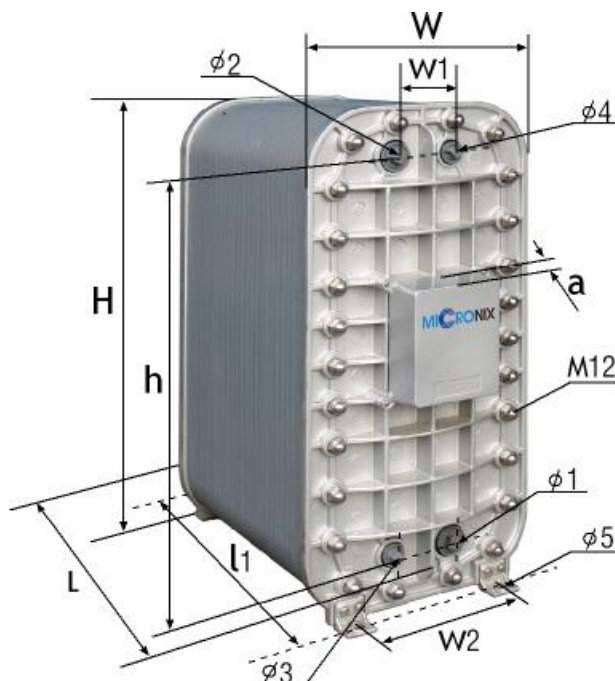
Concentrate water flow rate:

$$\text{concentrate water flow rate} = \left( \frac{\text{Flux Rate}}{\text{Recovery}} \times 100\% \right) - \text{Flux Rate} \quad (\text{flow unit m}^3 / \text{h})$$

$$\text{Dilution water flow} = \text{production flow} \quad (\text{flow unit m}^3 / \text{h})$$

$$\text{Inlet concentrate water flow} = \text{outlet concentrate water flow} \quad (\text{flow unit m}^3 / \text{h})$$

### 3.3, EDI stack basic installation size



details	L	W	H	h	L1	w1	w2	φ 1	φ 2	φ 3	φ 4	φ 5	M	a
MX-50	310	310	680	535	188	80	200	DN25 (1")	DN25 (1")	DN15 (1/2")	DN1 5 (1/2 ")	10.5×20 (Long hole)	M1 2	50
MX-100	395	310	680	535	280	80	200							
MX-200	580	310	680	535	465	80	200							
MX-300	705	310	680	535	585	80	200							

The data error is  $\pm 5\text{mm}$ , the detailed dimension please check the physical.

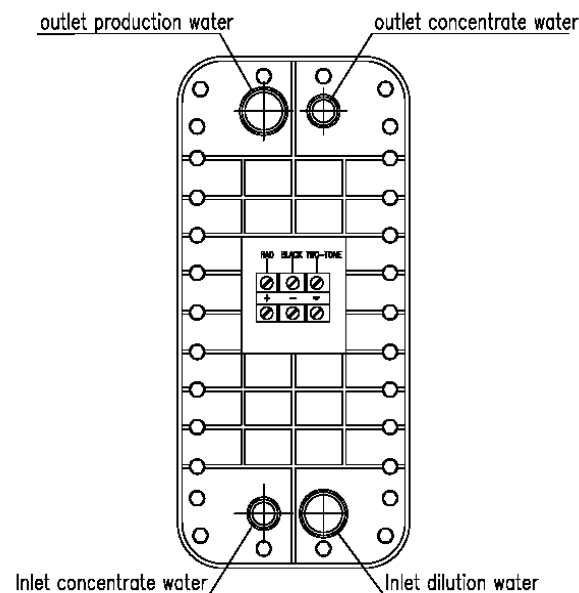
### 3.4, EDI stack pipe line connect

Can reference the following diagram takeover and wiring, also can be based on the actual project take over process requirement to adjust.

This stack inlet (dilution water and concentrate water) is in bottom and outlet (water production and concentrate water drain) at upper.

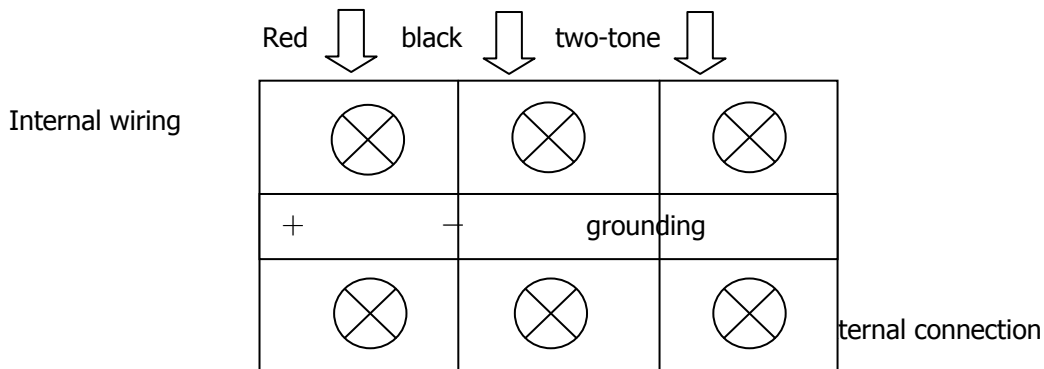
(Recommends the recommendations of this manual process)

Reference the appended drawings



### EDI stack of terminals

Located in EDI stack of both ends of the junction box is used to connect the power supply in use, it can choose any junction box as wiring. In the wiring must, in accordance with what is shown below method, do not error the wiring.



### 3.5, system design, consider other factors

- 1, considering the reserve cleaning system pipe connector
- 2, consider stack regeneration can build from when the itself circulation line
- 3, consider build system has a bypass device
- 4, concentrate water vent must set up independently and can't have back pressure situation exists, requirements and other pipeline management to avoid.
- 5, EDI system in continuous operating condition can play the best effect, if the end user cannot meet the conditions of use this requirement, should consider adding the cycle device, reduce system equipment intermittent shut-down times.

## IV, EDI equipment operation, regeneration and clean

### 4.1, EDI equipment operation

EDI equipment should have the following parts to form

EDI stack

Rectifying power supply

Flow meter

Resistivity instrument

Pressure gauge

PLC control box

Power control instrument

Connection pipe, valve

Grounding protection connections

#### 4.1.1, equipment operation the preparing work before

Confirm the inlet water quality to EDI stack, it meet inlet water condition.

Check all bolts of both ends of the EDI stack plate bolt if full lock

Check the stack of the DC power supply of wiring is correct

Check the power supply local control plate LCP electricity switch on

Check to make sure pump motor running direction is correct

Check each instrument working power if it meets requirements  
 Check each instrument working range set whether to conform to the requirements set the scene  
 Adjustment set the flow limit switch value (water production, inlet concentrate water, concentrate water drainage)  
 Set dilution water into water pressure and flow  
 Set inlet concentrate water feed water pressure and flow rate  
 Set outlet concentrate water pressure and flow  
 Setting water production pressure and flow  
 Check whether each regulating valves in an open position (initial adjustment of the first opening 1/2)

4.1.2, equipment operation

Equipment first time operation

Adjust water production, inlet concentrate water, outlet concentrate water of the limit protection switch to set data flow and fixed lock, in LCP control panel will booster pump switch transferred to manual, start booster pump to stack injection water, through production water flow meter, concentrate water flow meter water drain, adjust the water production, and concentrate water inlet water valve and concentrate water drain valve, achieve the set value (see form). Will then EDI stack switch of spin to automatic transmission, about 5 to 10 seconds electricity automatically after operation.

4.1.2, equipment operation

Equipment during the operation

Adjust water production, strong water water, strong water drainage of the limit protection switch to set data flow and fixed lock, in PLC control panel will booster pump switch transferred to manual, start to film piece of water injection booster pump to water production flow meters, strong water water supply, water drainage salinity water flow through valve, adjust the water production, and strong water inlet water valve and strong water drain valve, achieve the set value (see form). Will then EDI stack switch spin to automatic transmission, about 5 to 10 seconds electricity automatically after operation.

addendum

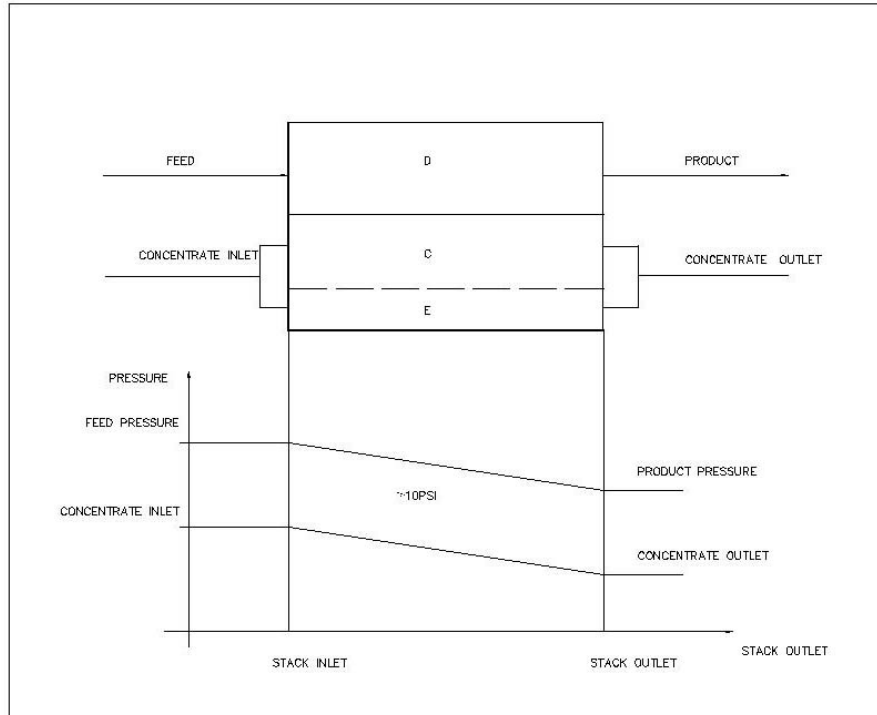
details	MX-50	MX-100	MX-200	MX-300	Flux Rate > 3m <sup>3</sup> /h
Production flow (l/h)	500	1000	2000	3000	Design value
Concentrate water drain flow (l/h)	125-100	200-100	400-200	600-300	recovery 80-90%

Note:

Dilution water feed water pressure  $\geq$  concentrate water feed water pressure 10 PSI  $\approx$  0.07 MPa

Water production water pressure  $\geq$  concentrate water drainage 10 PSI pressure  $\approx$  0.07 MPa

Below is the pressure difference relationship graphics



Equipment is started, the initial current EDI set to 1.2-2.2 A.

Experience tip: current set can be view from the concentrate water flow meter bubble adjustment, to adjust to just the bubble vent, and intermittent out (4 to 8 seconds/times) appropriate for current

When the system is in a stable operation state, and then began to record the operation data equipment. The record is usually data every two hours recording an (see EDI running record).

EDI systems is power operation equipment, enough to cause damage to personal safety, so in rectifier work, don't touch it, and ensure that the work field equipped with the necessary safety grounding measures.

The normal operation of the equipment

After the commissioning, can turn into the normal operation. First the equipment according to the manual stop methods of article 1 and 2 for equipment to halt, then on the panel of LCP booster pump switch transferred to automatic transmission, EDI stack switch choice of transferred to automatic transmission, the system will automatically into operation.

Tip:

The system automatically run into the conditions must be is to meet:

The clean water tank water level in the middle, high level switch over

Production water tank water level is middle and low level below

Water production and inlet concentrate water and concentrate water drain flow rate above in the set limit value

Concentra water drain is  $\leq 0.03$  MPa pressure should be

Equipment of down

Manual operation stop

In LCP panel of choice will EDI stack switch to "stop" position

The choice of the booster pump will switch to "stop" position

Booster pump inlet water valve closed, water production valve, concentrate water discharge valve

Automatic operation stop

Equipment during normal operation, in the tank to set level value will automatically be stopped running.

In order to ensure the safe operation of the EDI, control of the system in the following several automatic chain control, and when not meet the following conditions, including one of equipment will automatically stop running: Concentrate water into water flow, and concentrate water is the flow of water in one of the flow of water below their respective or the setting, limit switch will automatically action.

To the water level in low or high water level, liquid level switch can automatically action.

Booster pump overload

Rectifying power supply fault

Tip: EDI rectifier equipment etc must not have the RO (or the same water quality of water) through the equipment or equipment in place next time when it takes a long time to regenerate.

Equipment long to halt

If EDI service system for more than three days, it should be well long time to halt protection against the EDI internal microbial breed.

Cut off all the LCP control in the power switch.

Allow EDI pipeline system; avoid it left empty water being stagnant water.

Close all valves of the system.

Long after the restart, suspended stack may need to disinfect clean or regeneration.

The operation experience suggest the occur in any two or more conditions should be considered when the stack of chemical cleaning:

The inlet water temperature, flow under the condition of invariable, feed side and water production side of the differential pressure than the original data rise 30%.

The inlet water temperature, flow under the condition of invariable, strong water into water side and strong water drainage side of pressure difference than the original data rise 30%.

The inlet water temperature, flow and conductivity under the condition of invariable, water production water quality (resistivity) obvious fell 35%.

The inlet water temperature, flow under the condition of invariable, strong water is the flow of water fell 35%.

Stack of the working voltage of more than 20% of the initial adjustment voltage.

No matter in what stack piece of electrical operation mode (steady flow or voltage, should pay attention to observation they change tendency.

#### 4.2, equipment of chemical cleaning and regeneration

Although EDI stack inlet water condition reduced stack of internal obstruction of the opportunity, but with the equipment running time is extended, will EDI stack internal waterway still has an obstruction, this is mainly EDI into the water contained more solute in thick, formed in concentrate water room to a certain concentration product and material separation and precipitation. If water contain a lot of calcium magnesium ions (hardness more than 0.8 ppm), CO<sub>2</sub> and high pH value, it will speed up the precipitating the speed of the precipitation. In that case, we can through the method of chemical cleaning of EDI stack block of cleaning, back to the original technical characteristics.

Usually judge EDI stack are pollution jams can stack from the following several aspects of assessment, if a judge to two or more phenomenon, it should be considered in time to stack of clean.

The main factors for the stack of jams there are some form:

Particle/colloid and blocking

Inorganic unclean plugging

Organic dirt wall  
Microbial pollution plugging

EDI cleaning note: in clean or disinfection first, please choose the right before chemicals and familiar with the rules for safe operation, and must not in component power not cutting off state of chemical cleaning.

Particle/colloid and blocking

When Inlet Water particle  $\geq 5 \mu\text{m}$ , it causing cell way port congestion, the cause of the stack inside uneven distribution, leading to lower the overall performance of the stack. If EDI stack of fill not directly by the RO water production end into the EDI stack of, but through the RO booster pump, water supply in water tank after Suggestions into EDI stack in front of adding the micro filter (less than  $1 \mu\text{m}$ ). In the assembly, all the equipment EDI pipeline system connected should be rinsed clean to prevent the impurity particles pipe into the stack.

Inorganic unclean plugging

If EDI feed water contained more solute and beyond the design value or recovery than design value, will lead to concentrate water room and a cathode room scaling, generation of salt precipitation, usually separation material types of fouling for calcium and magnesium carbonate ions generated. Even if this kind of material is very small, the concentration of the contact time is very short, but also with the running time of the accumulative, there are still happen of fouling, the hardness and scaling could easily through the pickling removed. According to the method of scheme 1, using low pH solution in system internal circulation cleaning, can remove concentrate water room and a cathode room scaling.

When fill the iron and manganese containing high, or high TDS water into the EDI stack, also can make the dilution water room ion exchange resin or concentrate water formation and inorganic blocking. Can used for cleaning scheme 2.

Organic dirt wall

When water organic pollutants containing more than TEA or TOC design standard, the dilution water room of ion exchange resin and ionic membrane will happen and plugging. Organic can use scheme 3 methods, and use high pH value potions of dilution room and concentrate water room cycle can be clean organic molecules out of the ion exchange resin on the unclean plugging for cleaning.

Microbial pollution plugging

When the equipment running environment suitable for microbial growth, or into the water have many bacteria and algae, EDI stack and system will also happen microbial pollution blocking. Can use scheme 3, 4 of the method is to use a high pH salt water for cleaning. If the microbial pollution plugging situation is more serious, can use scheme for cleaning 5. If at the same time with inorganic unclean plugging may, in accordance with the plan and join pickling steps.

For extremely serious microbial pollution plugging, can use scheme 7 or 8 with high pH elixir to clean.

Below is a list: choose cleaning solution

Questions/scheme	1	2	3	4	5	6	7	8
concentrate water room scaling	☆							
Dilution water room scaling		☆						
Organic dirt wall			☆					
Organic matter and blocking and scaling				☆				
Microbial pollution plugging			☆					
Microbial pollution blocking and scaling				☆				
Serious microbial pollution blocking					☆			
Serious microbial pollution blocking and scaling						☆		
Extremely serious microbial pollution blocking							☆	
Extremely serious microbial pollution blocking and scaling								☆

The cleaning solution of the main operation steps

steps	1	2	3	4	5	6	7	8
Step 1	concentrate water room pickling	pickling	Alkaline cleaning	pickling	Salt water cleaning	pickling	Salt water cleaning	pickling
Step 2	flush	flush	flush	Alkaline cleaning	flush	Salt water cleaning	flush	Salt water cleaning
Step 3		regeneration	regeneration	flush	disinfection	flush	disinfection	flush
Step 4				regeneration	Salt water cleaning	disinfection	Alkaline cleaning	disinfection
Step 5					flush	Salt water cleaning	flush	Alkaline cleaning
Step 6					regeneration	flush	regeneration	flush
Step 7						regeneration		regeneration

Each time the cleaning method

Cleaning method	Time (minutes)	note
pickling	45-90	
Alkaline cleaning	45-100	
Salt water cleaning	35-60	
disinfection	25-40	
flush	≥50	
regeneration	≥120	According to the system's requirement of process until it reaches the water resistance rate required index

A single stack of when cleaning solution with the dosage

model	With amount of liquids (liter)	note
MX-50	30	Pickling temperature 15-25°C
MX-100	40	Alkaline cleaning temperature 25-30°C
MX-200	50	With water solution must be RO water production or higher than the RO water production of deionizer water
MX-300	60	

For stack of greater than 1, the number of according to the table with the number of liquid stack of number multiplied by.

Cleaning with chemicals specifications

All chemical must use the recommended grade or higher than the recommended grade

chemicals	Recommend level	note
Hydrochloric acid (HCl)	Chemical pure or Reagent grade	
Sodium hydroxide (NaOH)	Chemical pure or Reagent grade	liquid: 50%w/w
Sodium chloride (NaCl)	Food grade、 Chemical pure or Reagent grade	Food grade≥99.8%
Hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> )	Chemical pure	30%
Peracetic acid (CH <sub>3</sub> COOOH)	Chemical pure	

Safety require

In a configuration cleaning solution, must wear protective clothing, protective glasses and protective gloves. Need cleaning equipment line must with other link device is the connection of the pipe complete isolation. Need cleaning equipment its power source must be completely cut off and have "is operating, and may not either" safety warning.

The cleaning process of cleaning work pressure can't more than 0.15 MPa.

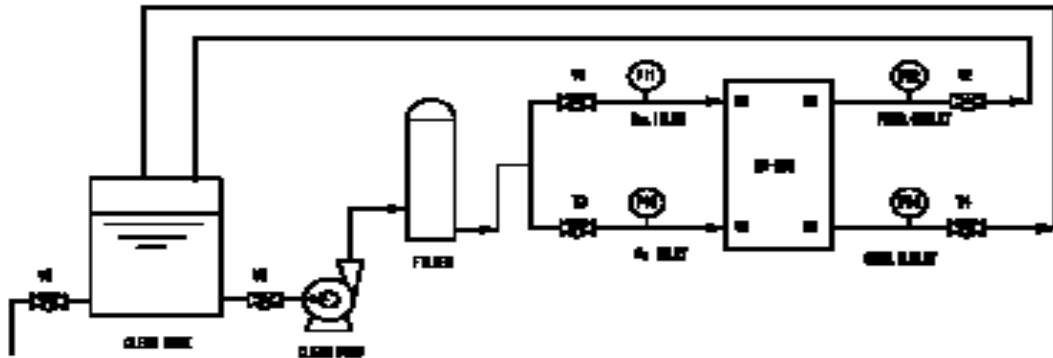
Cleaning equipment components

Cleaning circulating pump (anti-corrosive pumps)

Clean water tank (PP)

Corrosion cleaning tube (and cleaning pump adapter)

Corrosion resistant valve (UPVC)  
 Corrosion resistance pressure gauge  
 Filter (less than 1  $\mu$  m)  
 Tools: pH test paper (wide); the thermometer; stopwatch  
 Cleaning flow chart



Cleaning solution

Cleaning solution 1

Strong water room scaling cleaning

Record before. All data cleaning

Separation equipment and other equipment EDI pipeline connection

Connection cleaning device (see cleaning flow chart), make cleaning pump through the thick conduit road into EDI stack of back to clean water tank, concentrate water inlet and outlet valve opens, closed EDI dilution water inlet valve and water production valve.

Clean water tank configuration in the concentration of 2% hydrochloric acid cleaning.

Starting the cleaning pump, adjust the concentrate water inlet valve, the provisions of the circular to flow cleaning (pickling steps). (See appendix)

Stop emptying cleaning water tank cleaning pump, cleaning liquid, separate strong water drain valve to the trench.

To clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

Open EDI inlet valve and water production valve, at the same time two water room to wash.

Were testing water production and concentrated water conductivity equal feed water similar

10 each valve restore the original design flow data.

11 restore EDI each line and other systems of connection.

12 LCP control cabinet, power supply to open EDI membrane, turn to the normal operation of electric transmission, and make the record of the first running.

## Cleaning solution 2

Fresh water room scaling cleaning

Record before. All data cleaning

Separation equipment and other equipment EDI pipeline connection

Connection cleaning device (see cleaning flow chart), make cleaning pump through the feed line way into EDI film block respectively freshwater room and of strong water room, back to clean water tank, open all water of pass in and out of the valve.

Clean water tank configuration in the concentration of 2% hydrochloric acid cleaning.

Starting the cleaning, regulate water pump, thick, fill valve, the provisions of the circular to flow cleaning (pickling steps). (See appendix)

Stop emptying cleaning water tank cleaning pump, cleaning liquid, separate strong water drain valve to the trench.

To clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

Dilution water and strong water were testing the water side of the water quality, and water until the similar conductivity.

Adjust each valve; restore the original design flow data.

10 stop run, restore EDI pipeline and other system of each connection.

11 LCP control cabinet, power supply to open, EDI stack of regeneration either (regeneration steps) until the resistance ratio to the water requirements so far.

12 convert to normal operation, and make the record.

## Cleaning solution 3

Organic matter and plugging cleaning

Record before. All data cleaning

Separation equipment and other equipment EDI pipeline connection

Connection cleaning device (see cleaning flow chart), make cleaning pump through the feed line way into EDI stack respectively dilution water room and of concentrate water room, back to clean water tank, open all water of pass in and out of the valve.

Clean water tank configuration in the concentration of 1% sodium hydroxide ( $\text{NaOH}$ ) + 3% salt ( $\text{NaCl}$ ) each.

Starting the cleaning, regulate water pump, thick, fill valve, the provisions of the circular to flow cleaning (alkaline cleaning steps). (See appendix)

Stop emptying cleaning water tank cleaning pump, cleaning liquid, separate strong water drain valve to the trench.

To clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

Were testing water production and concentrated water conductivity equal feed water similar adjust each valve, restore the original design flow data.

10 stop run, restore EDI pipeline and other system of each connection.

11 LCP control cabinet, power supply to open, EDI stack of regeneration either (regeneration steps) until the resistance ratio to the water requirements so far.

12 convert to normal operation, and make the record.

#### Cleaning solution 4

Organic matter and blocking and scaling

Record before. All data cleaning

Separation equipment and other equipment EDI pipeline connection

Connection cleaning device (see cleaning flow chart), make cleaning pump through the feed line way into EDI stack respectively dilution room and of concentrate water room, back to clean water tank, open all water of pass in and out of the valve.

Clean water tank configuration in the concentration of 2% hydrochloric acid cleaning.

Starting the cleaning, regulate water pump, thick, fill valve, the provisions of the circular to flow cleaning (pickling steps). See appendix)

Stop emptying cleaning water tank cleaning pump, cleaning liquid, separate strong water drain valve to the trench.

To clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

Were testing water production and concentrated water conductivity equal feed water similar Clean water tank configuration in the concentration of 1% sodium hydroxide ( $\text{NaOH}$ ) + 3% salt ( $\text{NaCl}$ ) each.

10 starts cleaning regulate water pump, thick, fill valve, the provisions of the circular to flow cleaning (alkaline cleaning steps). (See appendix)

11 stop cleaning pump, water tank cleaning wastewater cleaning emptying, and separation of strong water drain valve to the trench.

12 to clean water tank into water continuous (RO water production), starting the cleaning pump continuous cleaning (washing steps).

13 were testing water production, the water quality of water salinity water, and water until the similar conductivity.

14 to adjust various valve, restore the original design flow data.

15 stop run, restore EDI pipeline and other system of each connection.

16 LCP control cabinet, power supply to open, EDI stack of regeneration either (regeneration steps) until the resistance ratio to the water requirements so far.

17 convert to normal operation, and make the record..

Microbial pollution can be used for wall plan 3

Microbial pollution blocking and scaling can be hungry the scheme 4

#### Cleaning put case 5

Serious microbial pollution blocking

Record before. All data cleaning

Separation equipment and other equipment EDI pipeline connection

Connection cleaning device (see cleaning flow chart), make cleaning pump through the feed line road into EDI stack dilution water room, concentrate water room, back to clean water tank, open all water of pass in and out of the valve.

Clean water tank configuration in the concentration of 2% salt ( $\text{NaCl}$ ) cleaning.

Starting the cleaning pump, adjust dilution water, concentrate water inlet valve, the provisions of the circular to flow cleaning (salt washing steps). (See appendix)

Stop emptying cleaning water tank cleaning pump, cleaning liquid, separate water production, strong water drain valve to the trench.

To clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

Were testing water production and concentrated water conductivity equal feed water similar Clean water tank in the concentration of 0.04% allocation of peracetic acid ( $\text{CH}_3\text{COOOH}$ ) + 0.2% of hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) cleaning.

10 start cleaning pump, regulate, fresh water, strong water inlet valve, the provisions of the circular to flow cleaning (disinfection steps). (See appendix)

11 stop cleaning pump, water tank cleaning wastewater cleaning emptying, and separation of strong water drain valve to the trench.

12 to clean water tank into water continuous (RO water production), starting the cleaning pump continuous cleaning (washing steps).

13 Were testing water production and concentrated water conductivity equal feed water similar

14 in the washing water tank with the concentration of 3% salt ( $\text{NaCl}$ ) cleaning.

15 starts cleaning pump, adjust dilution water, concentrate water inlet valve, the provisions of the circular to flow cleaning (salt washing steps). (See appendix)

16 stop cleaning pump, water tank cleaning wastewater cleaning emptying, separate water production, concentrate water drain valve to the trench.

17 to clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

18 Were testing water production and concentrated water conductivity equal feed water similar.

19 adjust various valve, restore the original design flow data.

20 stop run, restore EDI pipeline and other system of each connection.

21 LCP control cabinet open, to EDI stack of power transmission, regeneration (regeneration steps) until the resistance ratio to the water requirements so far.

22 convert to normal operation, and make the record.

#### Cleaning solution 6

Serious microbial pollution blocking and scaling

Record before. All data cleaning

Separation equipment and other equipment EDI pipeline connection

Connection cleaning device (see cleaning flow chart), make cleaning pump through the feed line road into EDI stack dilution water room, concentrate water room, back to clean water tank, open all water of pass in and out of the valve.

Clean water tank configuration in the concentration of 2% hydrochloric acid cleaning.

Starting the cleaning, regulate water pump, thick, fill valve, the provisions of the circular to flow cleaning (pickling steps). (See appendix)

Stop emptying cleaning water tank cleaning pump, cleaning liquid, separate strong water drain valve to the trench.

To clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

Dilution water and concentrate water were testing the water side of the water quality, and water until the similar conductivity.

Clean water tank configuration in the concentration of 3% salt ( $\text{NaCl}$ ) cleaning.

10 starts cleaning pump, adjust fresh water, strong water inlet valve, the provisions of the circular to flow cleaning (salt washing steps). (See appendix)

- 11 stop cleaning pump, water tank cleaning wastewater cleaning emptying, separate water production, strong water drain valve to the trench.
- 12 to clean water tank into water continuous (RO water production), starting the cleaning pump continuous cleaning (washing steps).
- 13 were testing water production, the water quality of water salinity water, and water until the similar conductivity.
- 14 in the washing water tank with the concentration of 0.04% of peracetic acid (CH<sub>3</sub>COOOH) + 0.2% of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) cleaning.
- 15 start cleaning pump, regulate, dilution water, concentrate water inlet valve, the provisions of the circular to flow cleaning (disinfection steps). (See appendix)
- 16 stop cleaning pump, water tank cleaning wastewater cleaning emptying, and separation of strong water drain valve to the trench.
- 17 to clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).
- 18 were testing water production, the water quality of water salinity water, and water until the similar conductivity.
- 19 in the washing water tank with the concentration of 2% salt (NaCl) cleaning.
- 20 starts cleaning pump, adjust fresh water, strong water inlet valve, the provisions of the circular to flow cleaning (salt washing steps). (See appendix)
- 21 stop cleaning pump, drained water tank cleaning wastewater cleaning, separate water production, and concentrate water drain valve to the trench.
- 22 to clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).
- 23 were testing water production, the water quality of water salinity water, and water until the similar conductivity.
- 24 adjust various valve, restore the original design flow data.
- 25 stop run, restore EDI pipeline and other system of each connection.
- 26 LCP control cabinet, power supply to open, EDI stack of regeneration either (regeneration steps) until the resistance ratio to the water requirements so far.
- 27 convert to normal operation, and make the record.

#### Cleaning solution 7

Extremely serious microbial pollution blocking

- 1 records all the data before cleaning.
- 2, separation equipment and other equipment EDI pipeline connection
- 3, links, cleaning device (see cleaning flow chart), make cleaning pump through the feed line road into EDI stack dilution water room, concentrate water room, back to clean water tank, open all water of pass in and out of the valve.
- 4, in clean water tank with the concentration of 3% salt (NaCl) cleaning.  
Starting the cleaning pump, adjust dilution water, concentrate water inlet valve, the provisions of the circular to flow cleaning (salt washing steps). (See appendix)  
Stop emptying cleaning water tank cleaning pump, cleaning liquid, separate water production, concentrate water drain valve to the trench.  
To clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

were testing water production and concentrated water conductivity equal feed water similar Clean water tank in the concentration of 0.04% allocation of peracetic acid ( $\text{CH}_3\text{COOOH}$ ) + 0.2% of hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) cleaning.

10 start cleaning pump, regulate, fresh water, strong water inlet valve, the provisions of the circular to flow cleaning (disinfection steps). (See appendix)

11 stop cleaning pump, water tank cleaning wastewater cleaning emptying, and separation of strong water drain valve to the trench.

12 to clean water tank into water continuous (RO water production), starting the cleaning pump continuous cleaning (washing steps).

13 were testing water production, the water quality of water salinity water, and water until the similar conductivity.

14 in the washing water tank with the concentration of 1% sodium hydroxide ( $\text{NaOH}$ ) + 3% salt ( $\text{NaCl}$ ) each.

15 starts cleaning regulate water pump, thick, fill valve, the provisions of the circular to flow cleaning (alkaline cleaning steps). (See appendix)

16 stop cleaning pump, water tank cleaning wastewater cleaning emptying, and separation of strong water drain valve to the trench.

17 to clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

18 were testing water production and concentrated water conductivity equal feed water similar 19 adjust various valve, restore the original design flow data.

20 stop run, restore EDI pipeline and other system of each connection.

LCP control cabinet, 21 open to EDI film piece of power transmission, regeneration (regeneration steps) until the resistance ratio to the water requirements so far.

22 convert to normal operation, and make the record.

#### Cleaning put case 8

Extremely serious microbial pollution blocking and scaling

1 records all the data before cleaning.

2 separation equipment and other equipment EDI pipeline connection

3 connect lines, cleaning device (see cleaning flow chart), make cleaning pump through the feed line road into EDI stack dilution water room, concentrate water room, back to clean water tank, open all water of pass in and out of the valve.

4 in clean water tank with the concentration of 2% hydrochloric acid cleaning.

5 starting the cleaning pump regulate feed water valve and concentrated valve, the provisions of the circular to flow cleaning (pickling steps). (See appendix)

6 stop cleaning pump, drained water tank cleaning wastewater cleaning, and separation of strong water drain valve to the trench.

7 to clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).

8 were testing water production and concentrated water conductivity equal feed water similar

9 Clean water tank configuration in the concentration of 3% salt ( $\text{NaCl}$ ) cleaning.

10 starts cleaning pump, adjust dilution water, concentrated water inlet valve, the provisions of the circular to flow cleaning (salt washing steps). (See appendix)

11 stop cleaning pump, water tank cleaning wastewater cleaning emptying, separate water production, strong water drain valve to the trench.

- 12 to clean water tank into water continuous (RO water production), starting the cleaning pump continuous cleaning (washing steps).
- 13 were testing water production and concentrated water conductivity equal feed water similar 14 in the washing water tank with the consistence of 0.04% of peracetic acid (CH<sub>3</sub>COOOH) + 0.2% of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) cleaning.
- 15 start cleaning pump, regulate, dilution water, concentrate water inlet valve, the provisions of the circular to flow cleaning (disinfection steps). (See appendix)
- 16 stop cleaning pump, water tank cleaning wastewater cleaning emptying, and separation of strong water drain valve to the trench.
- 17 to clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).
- 18 were testing water production and concentrated water conductivity equal feed water similar.
- 19 in the chemical water tank with the concentration of 1% sodium hydroxide (NaOH) + 3% salt (NaCl) each.
- 20 starts cleaning pump, adjust dilution water, concentrated water inlet valve, the provisions of the circular to flow cleaning (alkaline cleaning steps). (See appendix)
- 21 stop cleaning pump, drained water tank cleaning wastewater cleaning, separate water production and concentrated water drain valve to the trench.
- 22 to clean water tank continuous injection water (RO water production), starting the cleaning pump continuous cleaning (washing steps).
- 23 were testing water production and concentrated water conductivity equal feed water similar.
- 24 adjust various valve, restore the original design flow data.
- 25 stop the equipment; restore EDI pipeline and other system of each connection.
- 26 open PLC control cabinet, power supply to EDI stack of regeneration either (regeneration steps) until the resistance ratio to the water requirements so far.
- 27 into normal operation, and make the record of the first running

Attached list

model	Circulation cleaning flow (m <sup>3</sup> /h)
MX-50	0.6m <sup>3</sup> /h
MX-100	1.5m <sup>3</sup> /h
MX-200	2.5m <sup>3</sup> /h
MX-300	3.5m <sup>3</sup> /h

EDI stack of regeneration

EDI stack in cleaning completion after of the need regeneration.

The regeneration results of the stack to a large extent depends on the water quality , for regeneration water requirements is EDI of water production or is than conductivity  $\leq 6\mu$  s/cm RO water production.

Regeneration of steps:

A standard

Confirm EDI stack without any chemicals residue exist.

Make the system building into a closed circuit since the circulation line.

According to the normal operation of the flow of 1/2 adjust all the flow and pressure.

To adjust current from either EDI 1 A step slow start to EDI load current (maximum can't more than 4 A).

Until the water production resistivity of process requirement to or  $\geq 12$  M  $\Omega$ . Cm

Note:

- 1, Stack regeneration is a relatively long time, sometimes will grow up to 10-24 hours or even longer.
- 2, Regeneration water must be to less than 6  $\mu\text{s}/\text{cm}$  conductivity.

B, special circumstances

- 1, for in the system construction from the circulation line is not a system can follow the steps below to regenerate
- 2 Confirmation EDI stack without any chemicals residue exist.
- 3 According to the normal operation of the system, 50% of the flow rate adjusts various flow valves.
- 4, each pressure and pressure difference operation regulations in accordance with the regulated.
- 5, To adjust current from either EDI 1 A step slow start to EDI load current (maximum can't more than 4 A).
- 6, Until the water production resistivity of process requirement to or  $\geq 12 \text{ M } \Omega \cdot \text{Cm}$

Note:

- 1, Stack regeneration is a relatively long time, sometimes will grow up to 10-24 hours or even longer.
- 2, Regeneration water must be to less than 6  $\mu\text{s}/\text{cm}$  conductivity.

VI, MICRONIX stack quality guarantee

Stack of quality guarantee

Materials and manufacturing process of assurance

Micronix Company to ensure that all provide in the manufacture of EDI stack materials used and process are in line with the state environmental protection requirement.

The quality guarantee period

MICRONIX Company to ensure that all provide guarantee period of the EDI stack for 3 years, Storage time can't more than 10 months

Quality assurance conditions

The following conditions for one of the quality assurance commitment will be null and void

- Inlet water to Stack conditions does not accord requirement
- Turbidity water more than 1 NTU
- Inlet water SDI more than 1.0
- To ionic membrane harmful organisms or inorganic
- Inlet water temperature is greater than  $100^{\circ}\text{F} / 38^{\circ}\text{C}$ .
- In operation process of the pH value is less than 7 or more than 9
- In operation process of the work, more than 0.5 MPa pressure

In the process of any

- Contact chloride, ozone, potassium permanganate and strong oxidizer

In the film when cleaning

- Do not have found, silt sediment or particulate matter microorganism was cleaning out
- EDI end plate electrode can't have found for voltage or current sets more than caused by the numerical surface burn signs

VII, EDI system troubleshooting

The table below is EDI stack in the running of the trouble and often meet some elimination method, such as this form in accordance with the operation still can't solve problems, please contact with the company.

question	The possible causes of	solution
stack of leaking	Stack of during transportation, move or operation after a period of time	According to the endplate bolts rerun of tighten
Film piece of outlet is leaking	Film piece of adapter is loose	Tighten adapter Check the sealing ring
Control fault display light	Rectifying power supply TB2 in connection with the system if circuit connected  Rectifying power supply without voltage output	Check to make sure TB2 wiring and system circuit connected. Check to make sure rectifying power supply is normal operation
Light but no control displays current, voltage display	Rectifying power supply without DC output whether rectifying power supply TB2 in connection with the system power connected	Check the stack of terminals are connected correctly and reliable connection Check to make sure TB2 wiring and system circuit connected.
Control displays current data is not stable	Controller internal the temperature too high, which caused integrated IC set-point drift In other controlled inductive devices interference	Improve the controller internal ventilation cooling. Compulsory cooling pattern should be adopted. Isolation interference sources
Control displays have current shows no voltage show	Rectifying power supply and control displays of the data connection poor contact	Check the data line, replacement,
Control voltage display shows no current display	stack has scaled, itself has caused stack resistance increases of itself	On stack block chemical cleaning
Water production low resistivity	No DC power supply output Electrode joint loose Current set is not correct Do not accord with feed water conditions Flow switch value set too high, power blackout Feed water pressure low or differential pressure is wrong stack plugged or scaled	Check out, Check retightened Readjust the current Check the water quality, especially CO2 Check the switch position setting Check the reason to adjust Judge unclean plugging or scaling reasons, the corresponding cleaning solution for chemical cleaning
dilution Water flow in low	Dilution water room is plugged Feed water pressure low Feed water flow rate is too low Operating differential pressure increase product water flow in low	Check, judgment blocking reason and chemical cleaning, Increase water velocity Adjust feed water flow Chemical cleaning
No concentrated	Input/output of concentrated water valve no set	Readjust the concentrated water

water or concentrated low water flow	right concentrated water pollution scale and plugging or room	valve increase the flow The check and judge stack plugging or scaling reasons, the corresponding cleaning solution for chemical cleaning
stack of escaping gas too much	concentrated water drain pipe jam or have back pressure Current set too high	Exclude jam or back pressure Adjust lower current
production water pH value too high or low	Current set too high	Adjust lower current



## Packing list

Item	Description	Model	Quantity	Remark
1	EDI Stack	MX-XXX	1	According order provide model
2	Warning signs of stack		1	
3	Stack inspection report		1	The only corresponding inspection report
4	Operation manual		1	

### Environmental protection

The packaging use environmental protection data, product area after packaging materials can be reused, do not throw them away

## EDI Stack electric accessories

EDI stack of supporting power accessories

Note:

- 1, the supporting power accessories for customers, customers can choose parts according to their specific case to decide whether to choose.
- 2, if you choose this company's supporting annex, please in strict accordance with the attachment to the requirements stipulated in the electric control design.

1, EDI stack rectifying power supply

EDI stack will have a choice of the configuration of the rectifying power supply accessories, so you decide to purchase in our EDI, should be careful to business personnel need to confirm how specifications of electrical accessories with:

Rectifying power supply (MXD-3 A/B) (optional)

Model	Rectifying power supply mode	Input voltage specification	Output voltage specification
MX-50	MXD-3A	AC380V	DC330V
MX-100; MX-200	MXD-3B	AC380V	DC330V
MX-300	MXD-3B	AC380V	DC330V

MXD-3 is single phase DC power controllers, designed for supporting MX stack series products of rectifying power supply.

Device use high quality imported brand device, to ensure that the power of good device quality and stable operation.

Dc powers through a SCR single-phase ac power to realize that become a pulsed DC. After rectifying DC power and control displays through the communication line, which can adjust the DC power output voltage or current, and shows the DC output voltage or current value. Device compact structure, convenient installation, high reliability, wide range of voltage, strong anti-jamming capability.



### 1, product features

Compact structure, convenient installation and debugging.

High reliability.

Wide range voltage.

Strong anti-interference ability.

Have soft start and soft shut off the function.

Constant pressure or constant current output switches function.

Have limited flow design, can reliably protect EDI equipment.

The higher harmonic inhibition technology, output voltage pulse small.

Reliable protection rectifying power supply and EDI stack.

Can choose the working frequency of voltage

### 2, working parameters

Working frequency: 50/60 Hz (can choose a kind of, in the body internal)

The input voltage: single-phase 380 V AC plus or minus 10%

Output voltage: 0-300 VDC

Output current: 0-5.0 A

Device power: 8 w or less

Modulation mode: PWM

Runtime environment temperature: 0-45 °C

Shipment storage environment temperature: 60 °C-- 15 °C

Allow the humidity level: air relative humidity 85% or less, don't allow appear gel.

Climate level: according to the DIN IEC60 721-3-3 3 grade erp

Insulation class: according to the DIN VDE 0110-1 (HD 625.1 S: 1996) pollution level 2

Protection level: EN 60 529 IP00

Protection level: according to the DIN VDE 0160 the first part, grade 1

Contact level: according to the DIN VDE 0160 section 100 (VBG4) and DIN VDE 113 part 5

More than 1000 meters altitude: (elevation 100 meters, ratings for each additional down 1%)

Working way: work continuously

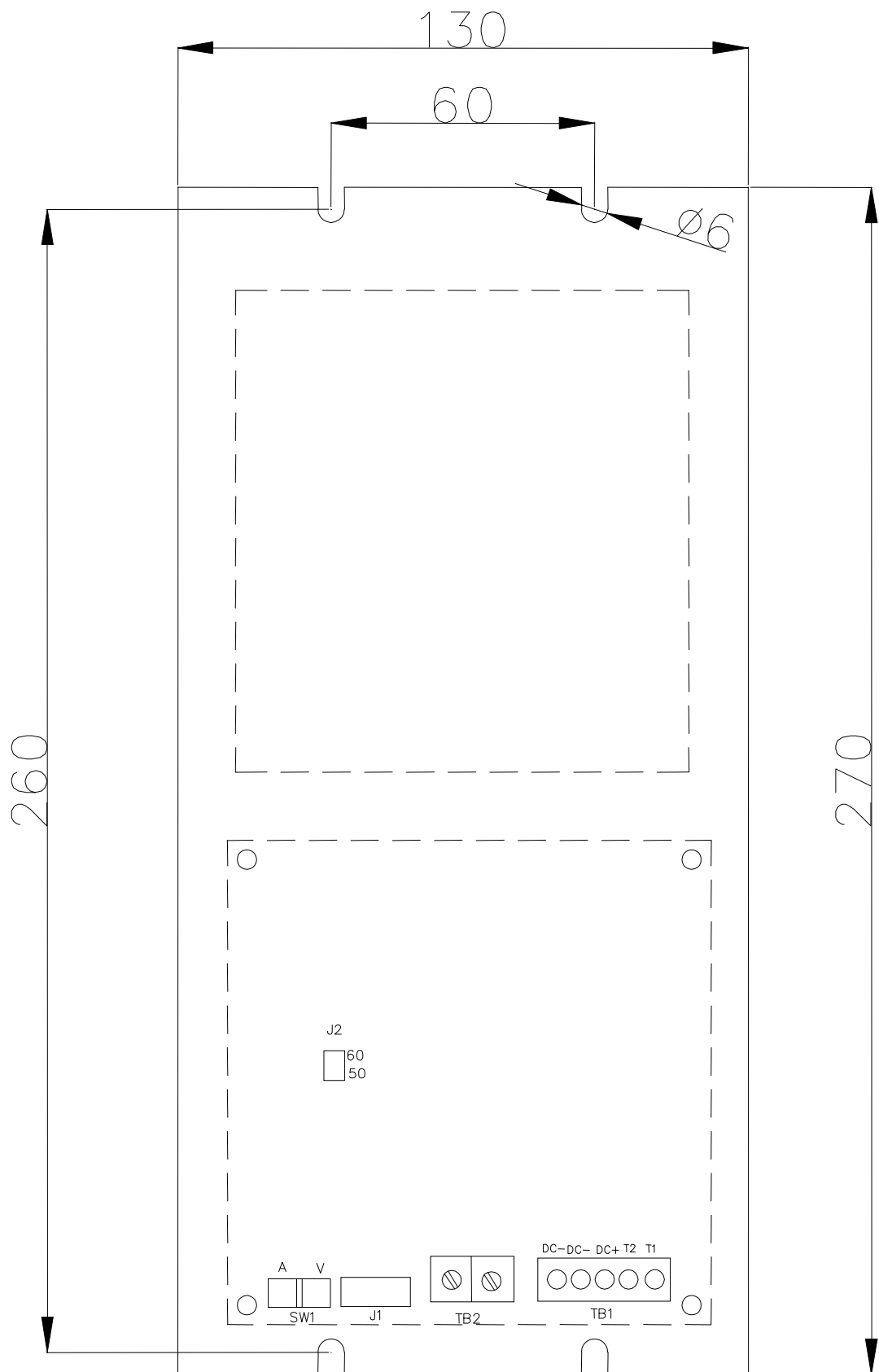
Cooling way: natural ventilation

### 3 Installation size figure

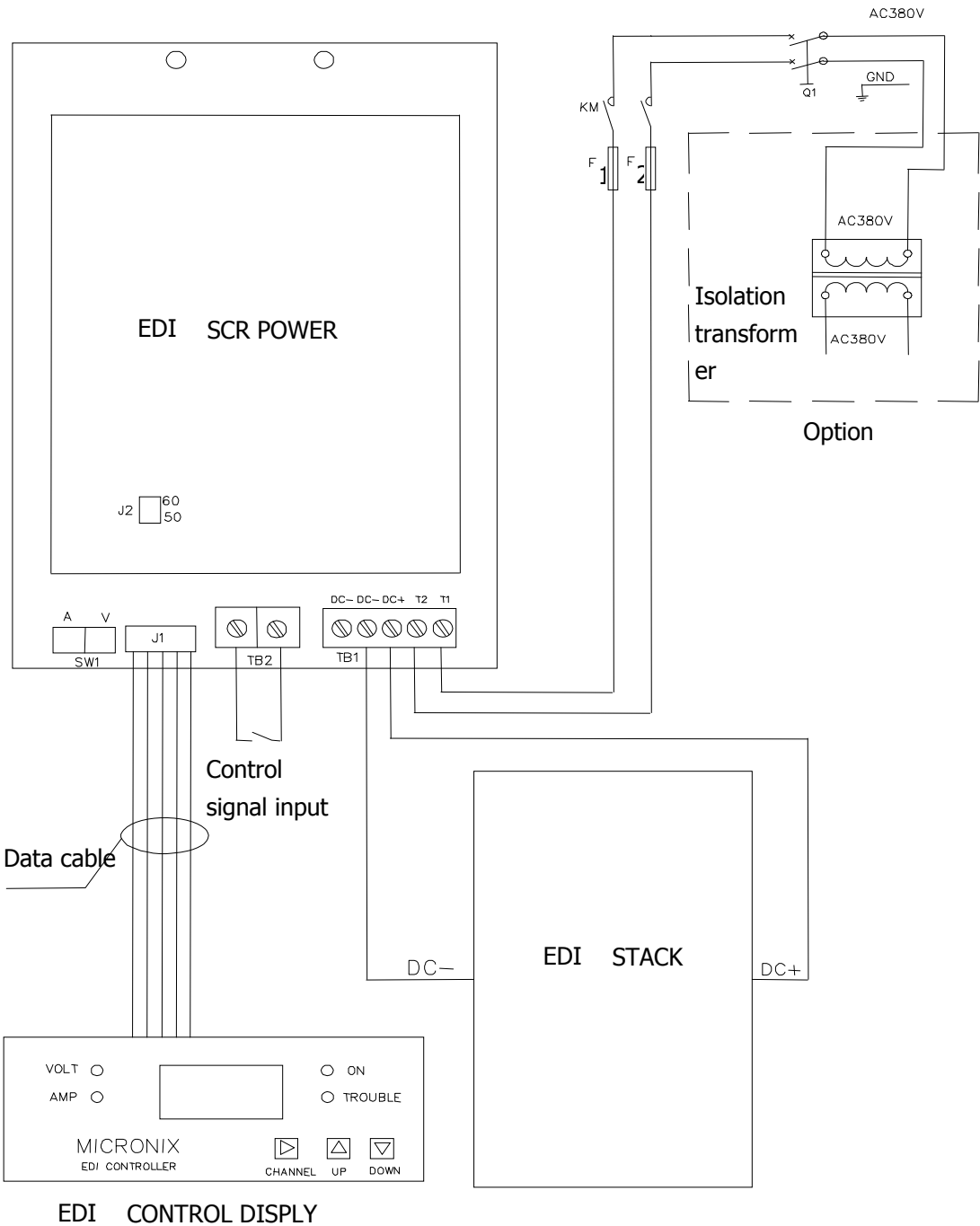
Shape dimension: W130 × D270 × H75 (mm)

Installation size: W60 × D260 (mm)

Weight:  $\leq$  1.3 Kg



Rectifying power supply the wiring diagram



Special note:

In EDI electrical design, in order to ensure the safe operation of the system, we require absolutely in the use of rectifying power supply device front add an isolation transformer.

Symbols mark

TB1

T1,T2-----Input AC single phase (380VAC, 50/60Hz)

DC+-----Output DC to EDI stack the positive electrode (0-5.0A//300VDC)

DC-----Output DC to EDI stack negative electrode (0-5.0A//300VDC)

DC----- Grounding (not to use the isolated transformer, the terminals may not grounding)

TB2-----Control signal input (no source signal, commonly used to flow switch control)

J1----- Communication signals connected terminals row (and display controller connection)

SW1----- A/V Constant current/constant pressure mode conversion switch

J2----- Working voltage frequency selection (50 Hz ac / 60 Hz) (pin)

## 2、 Display controller



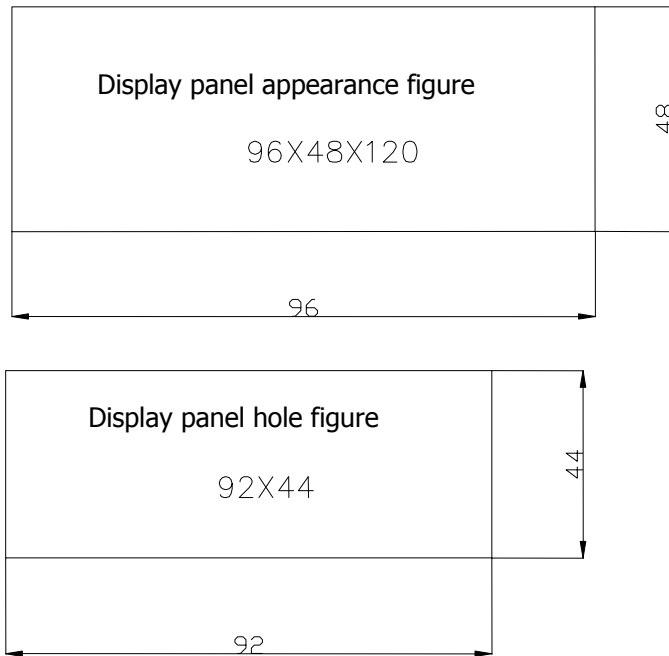
This display controller is used to control regulation DC power output, when using, only need to adjust the panel, under the arrow symbols, can adjust current button or the voltage of the output values (don't need to display Settings or adjustment).

1, Installation size figure

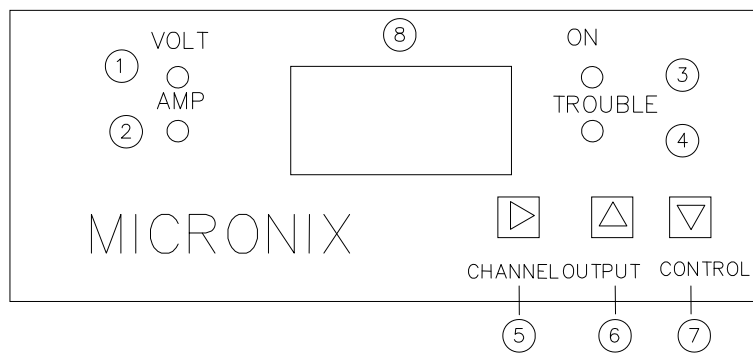
Shape dimension: W96 × D48 × L120 (mm)

Installation size: W92 × D44 (mm)

Weight:  $\cong$  0.4 Kg



2, the panel symbols that function



Display panel arrangement

(1) The VOLT (green) ---light: panel digital said DC voltage

(2) AMP (green) - - - - light: panel DC current digital said

(3) ON (green) - - - - -light: rectifying power supply work normal, EDI stack of can electrify.

TROUBLE-----light: fault shows, lack of water or block may stack rectifying power supply fault.



CHANNLE----- Display, press the switch not to put, show dc voltage, let go of the direct

current display



UP----- Upward adjustment values (output value rise)

When DC power set constant current control mode, is to adjust the direct current

When DC power set Constant voltage control mode, is to adjust the direct voltage.



DOWN----- Downward adjustment values (output value falls)

When dc power set constant current control mode, is to adjust the direct current

When dc power set Constant voltage control mode, is to adjust the direct voltage.

Showed value board ----- (three digital display)

Note: the display back ground symbols with the bottom of the terminals must be grounding attachment

o

Please use normal use constant current mode