

Irrigation Head System and Management



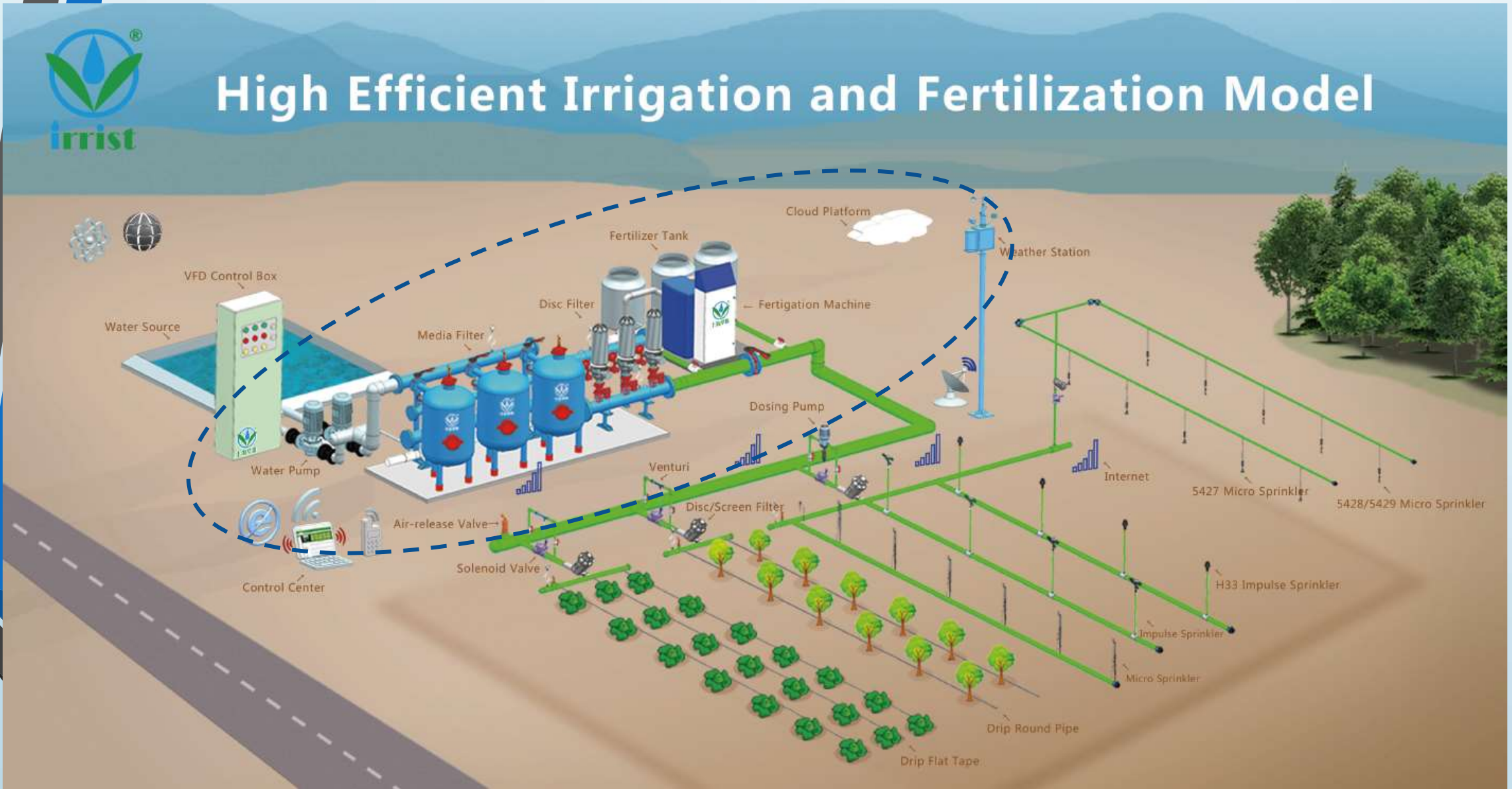
Basic Knowledge

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2018/10/15



High Efficient Irrigation and Fertilization Model



High Efficient Irrigation System Demonstration





Pumping Equipment

Pump / centrifugal pump



Basic parameters

flow

lift

power

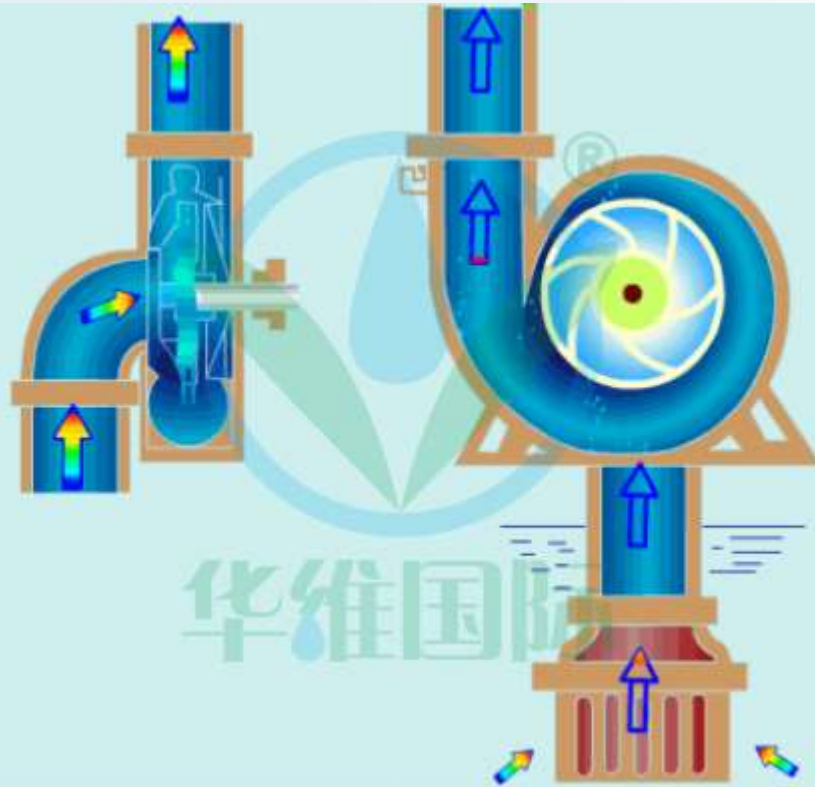
speed

efficiency

net positive suction

head required

离心泵原理



Before starting the pump, it needs to fill water.

When the centrifugal pump works, it relies on the high-speed rotating impeller, and the liquid obtains energy under the action of inertial centrifugal force to improve the pressure. Before the centrifugal pump works, the pump body and the inlet pipeline must be filled with liquid medium to prevent cavitation. When the impeller rotates rapidly, the blade causes the medium to rotate quickly. The rotating medium flies out of the impeller under the action of centrifugal force. After the water in the pump is thrown out, the central part of the impeller forms a vacuum region. One side continuously inhales the liquid, the other side unceasingly gives the inhaled liquid certain energy, discharges the liquid. Centrifugal pumps work so continuously..

Centrifugal pumps



Vertical centrifugal pump



Vertical multistage centrifugal pump



Horizontal centrifugal pump



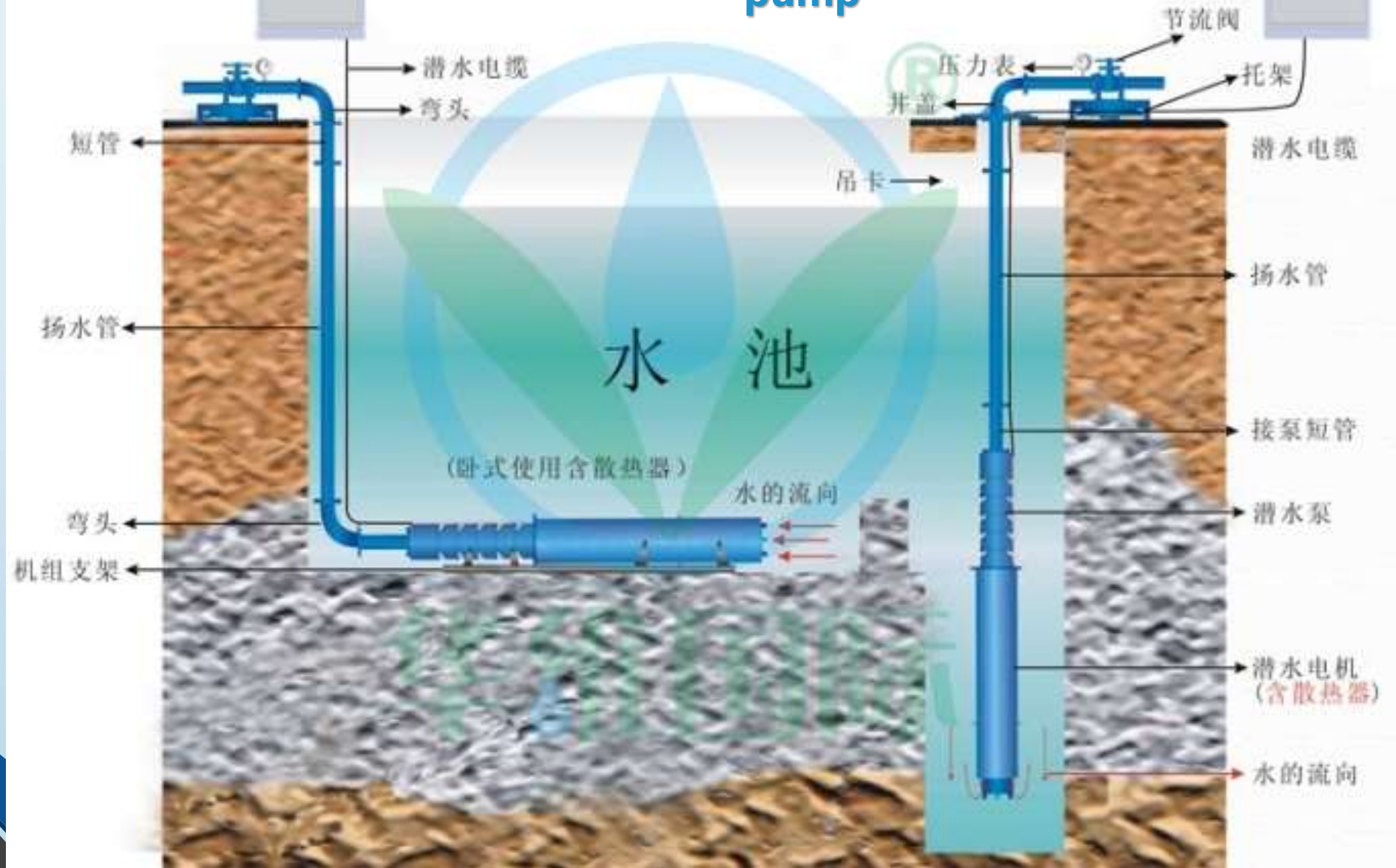
Self-sucking pump



Submersible pump

Type of pump	Feature
Vertical centrifugal pump	Easy installation, affordable, small foundation.
Horizontal centrifugal pump	Bigger flow rate, the maintenance is convenient, and the base is equipped.
Multistage centrifugal pump	Easy installation, high lift, suitable for high mountain water transfer.
Self-sucking pump	No need to fill water and combine the advantages of horizontal pump.
Submersible pump	Affordable, easy to install, and difficult to maintain.

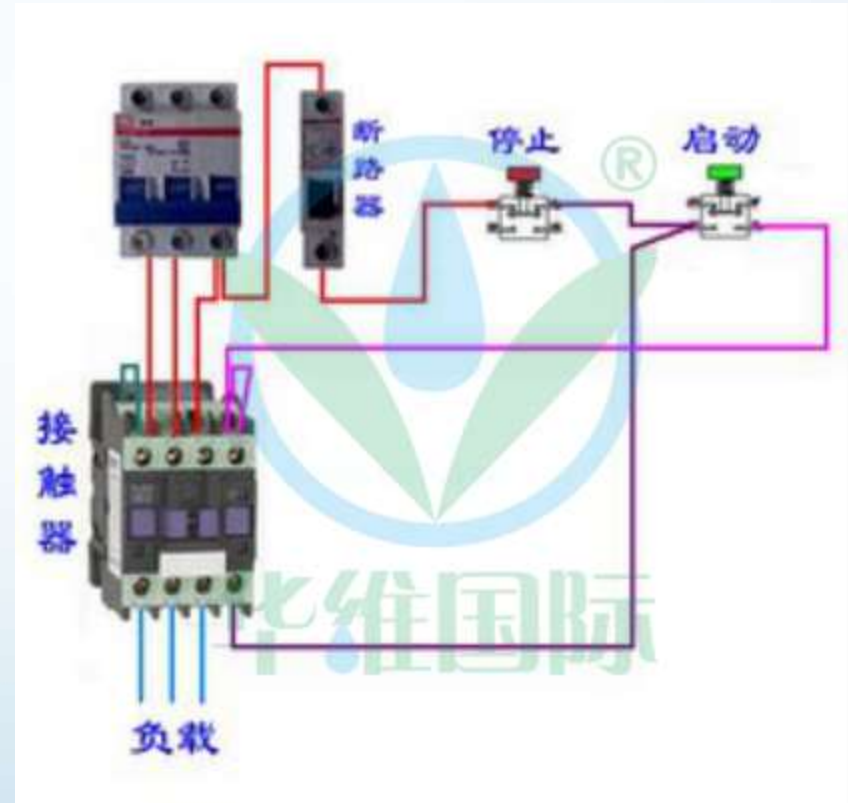
Installation of submersible pump





Control Equipment

General power control



VFD Constant Lift Control System

- Water supply on demand
- Power saving and labor saving
- Adjustable pressure
- Stable and reliable

More than 90% selection of efficient irrigation system.



Automatic Control System

On the basis of manual control, such as timing, program or sensor is added to realize the automatic operation according to the program or sensor signal without human control. After that, the system is automatically shut down and the cycle is rerunning.



Time control



Temperature /
humidity
control



Program
control



Wireless remote
control



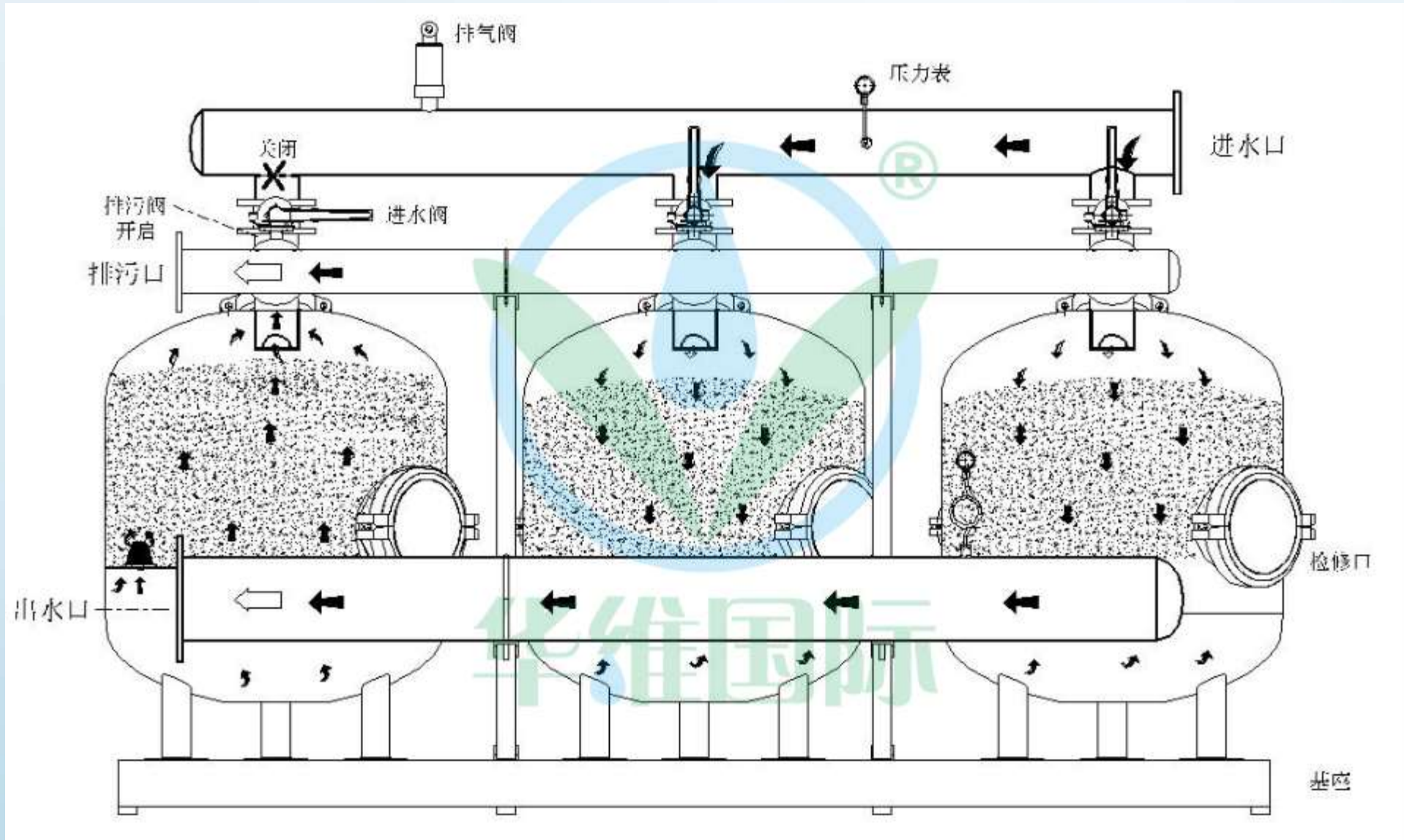
Filter equipment

- Micro and drip irrigation must be equipped with filtration system to prevent sediment and organic impurities from blocking the nozzles and emitters.
- Clogging is the inherent deficiency of micro irrigation. The resistance to clogging of micro irrigation is relative.
- There is no irrigation without filtration or absolutely no clogging.
- In any case, the importance of filtration system should be emphasized.
- There is no universal filter.
- The filter must be carefully selected according to the water source, water quality and the size of the emitter channel.

Media Filter



Used for primary filtration. Effective filtration of organic impurities in surface water.

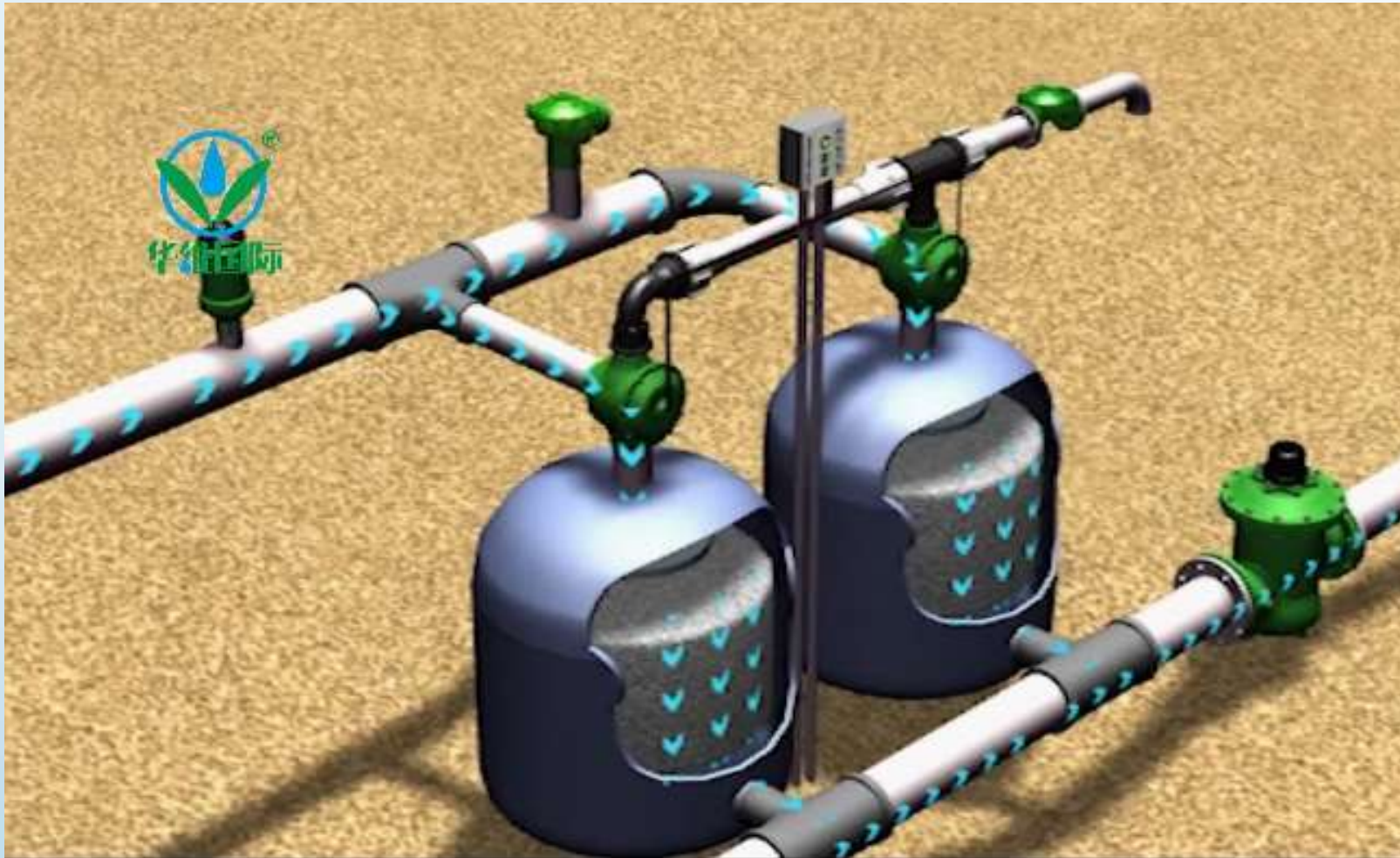


Automatic backflushing media filtration system



Two modes for time / pressure difference

Automatic backflush media filter working animation



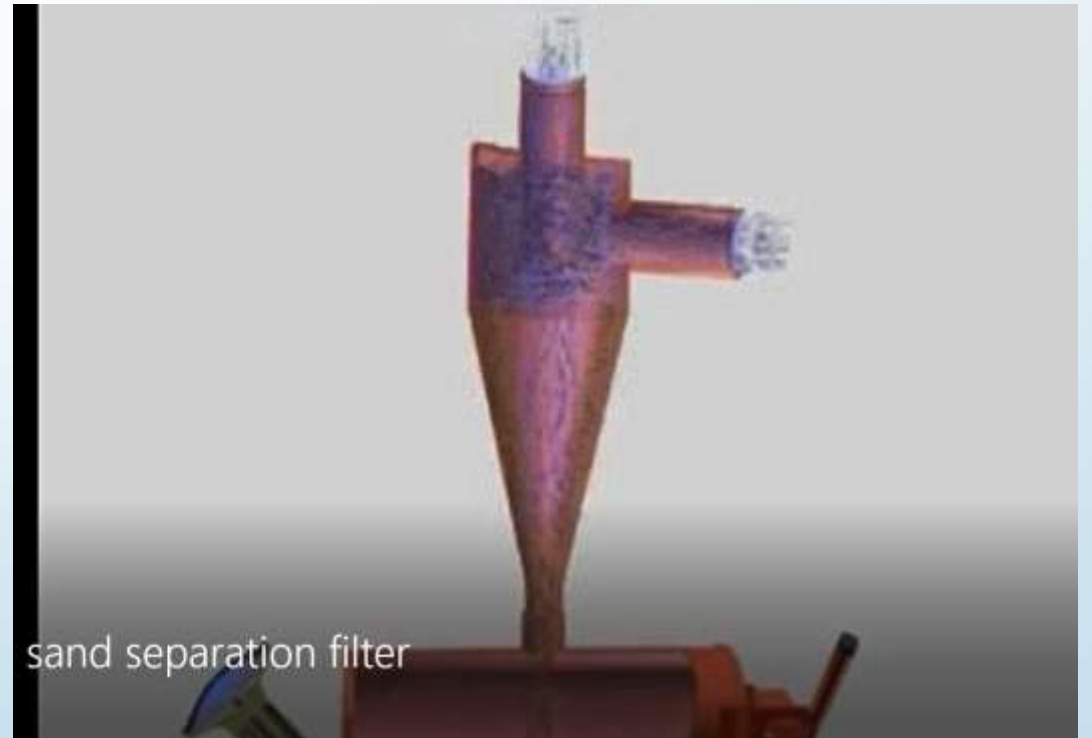
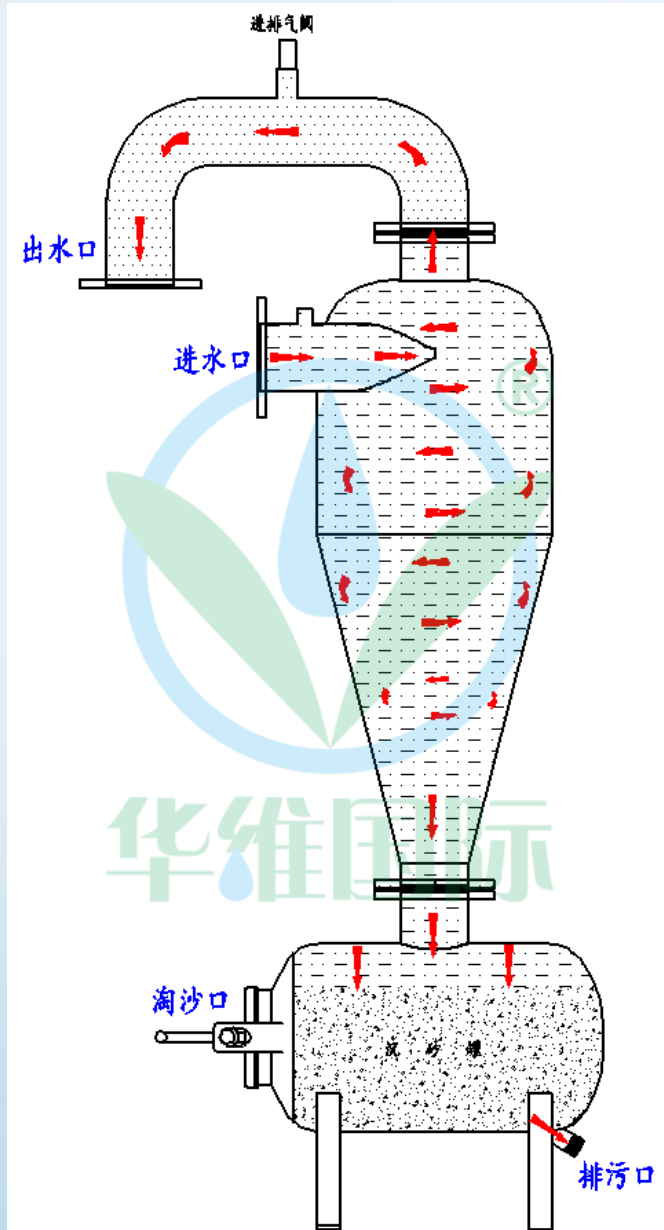


Centrifugal sand separation filter



Effective filtration of inorganic impurities (sand, gravel and other particulate matter)
Used for primary filtration

Suitable for water source: deep well / large amount of sandy water.





Disk Filter



**Commonly
used as
the second
stage
filtration.**

Disk / mesh filter

Special lengthening filter element is adopted to enlarge the surface area of the filter; centrifugal guide disc structure is adopted to form rotating centrifugal water flow in the cavity to avoid impurities adhering to the filter element, which effectively enhances the capacity of contamination, maximizes the cleaning cycle, reduces the system cost and maintenance costs.

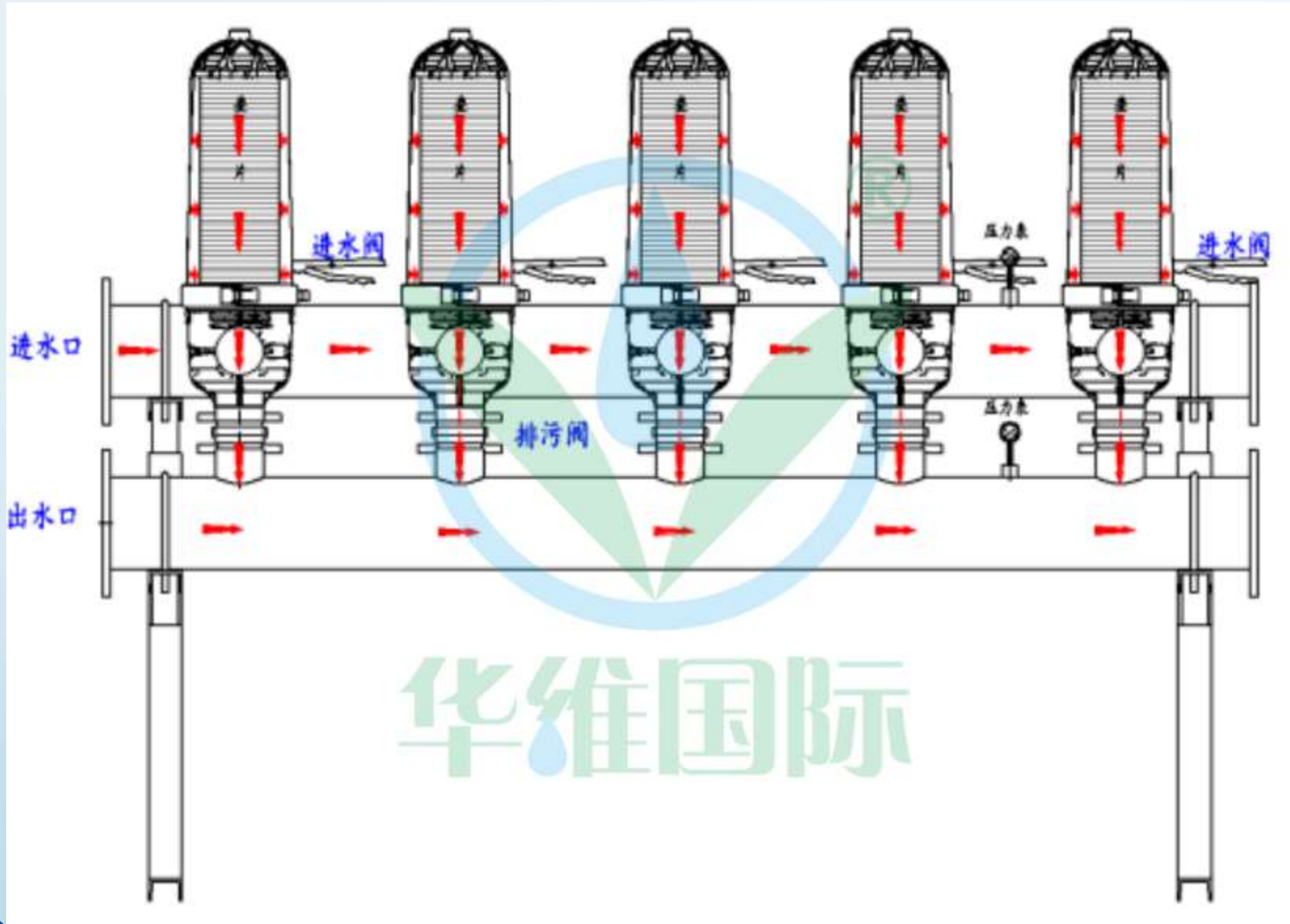
The disk is very complete, and the filtration accuracy covers all the commonly used specifications such as 80, 100, 120, 150, 200 microns. It is suitable for various irrigation systems and industrial water treatment.



7016 1.5" 叠片过滤器
7017 1.5" 网式过滤器



7032D 3" 叠片过滤器
7032S 3" 网式过滤器



Disk filters on Head System



DFA series disk automatic backflush filtration system

When working, the disk is compacted under the action of spring and hydraulic power, and impurities in the water are withheld. When backflushing, the controller controls a special three-way valve to change the direction of water flow. The disk sheets in the unit requiring backflushing are automatically loosened and rotated. The impurities are washed out through the sewage pipe by using the purified water filtered of other units.



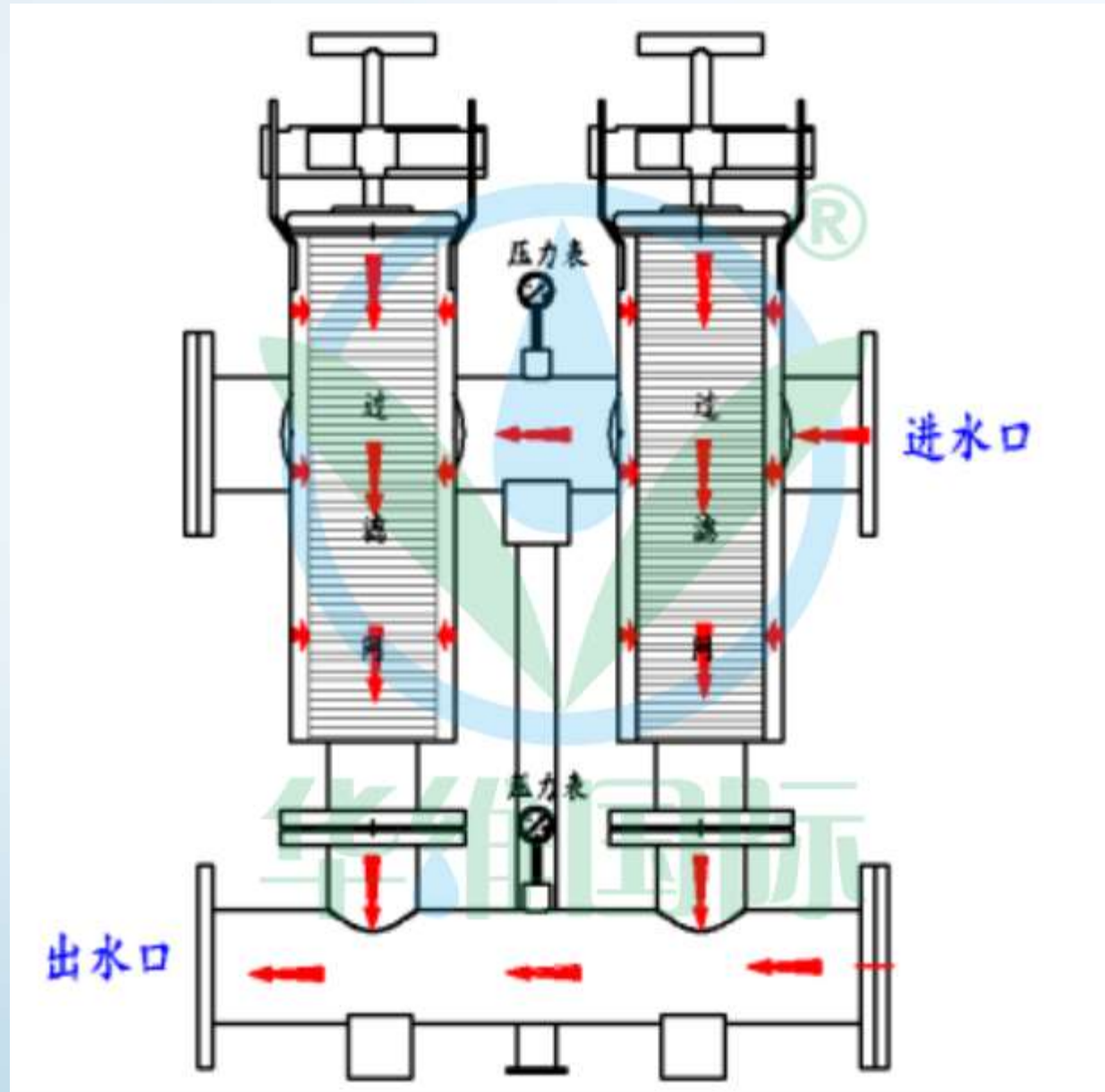
Auto backflush filter working animation



Mesh filter

Often used as second or three stage filtration equipment.

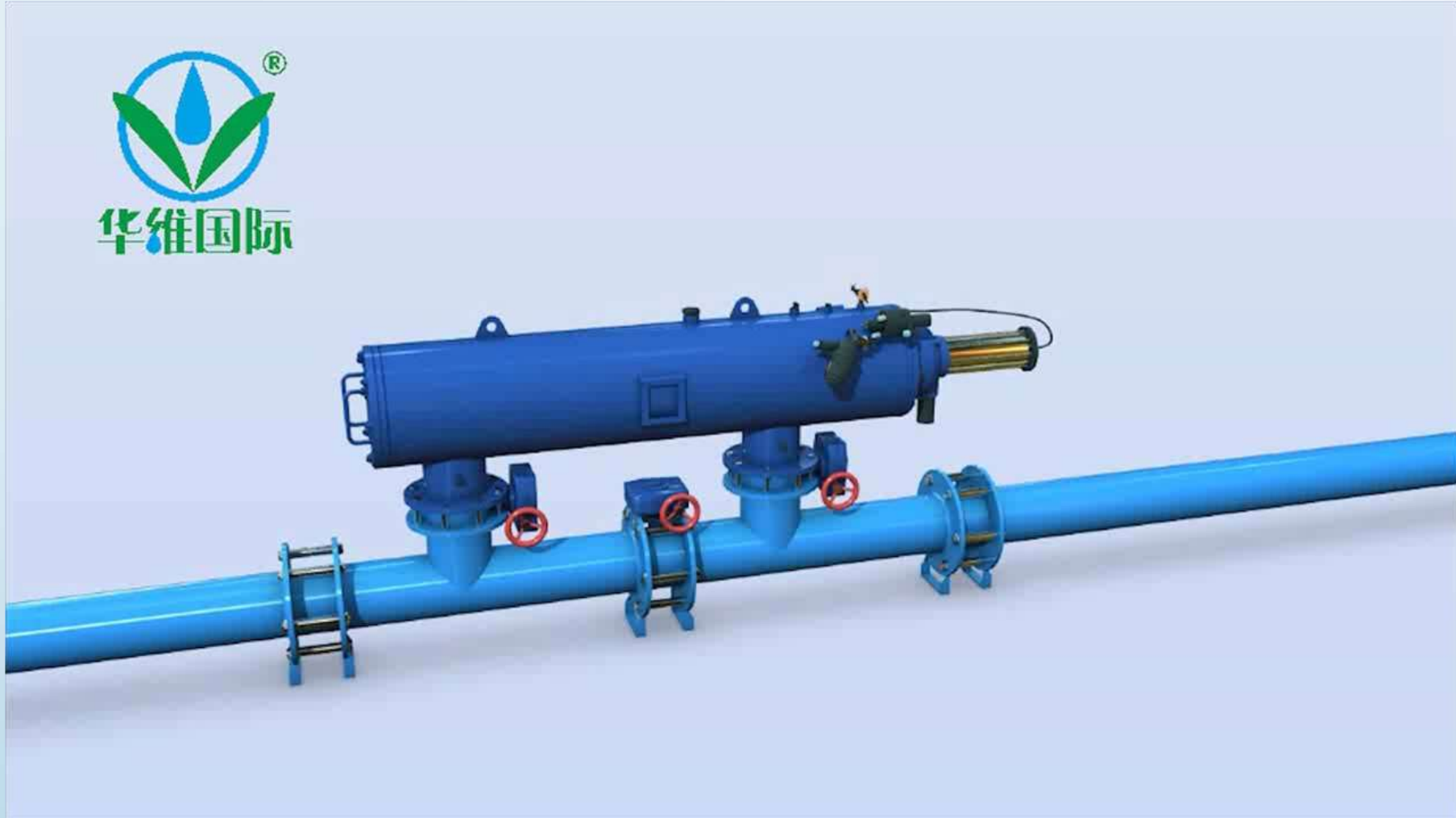




Self cleaning mesh filter



Self cleaning mesh filter working animation



Selection of filters for different irrigation system

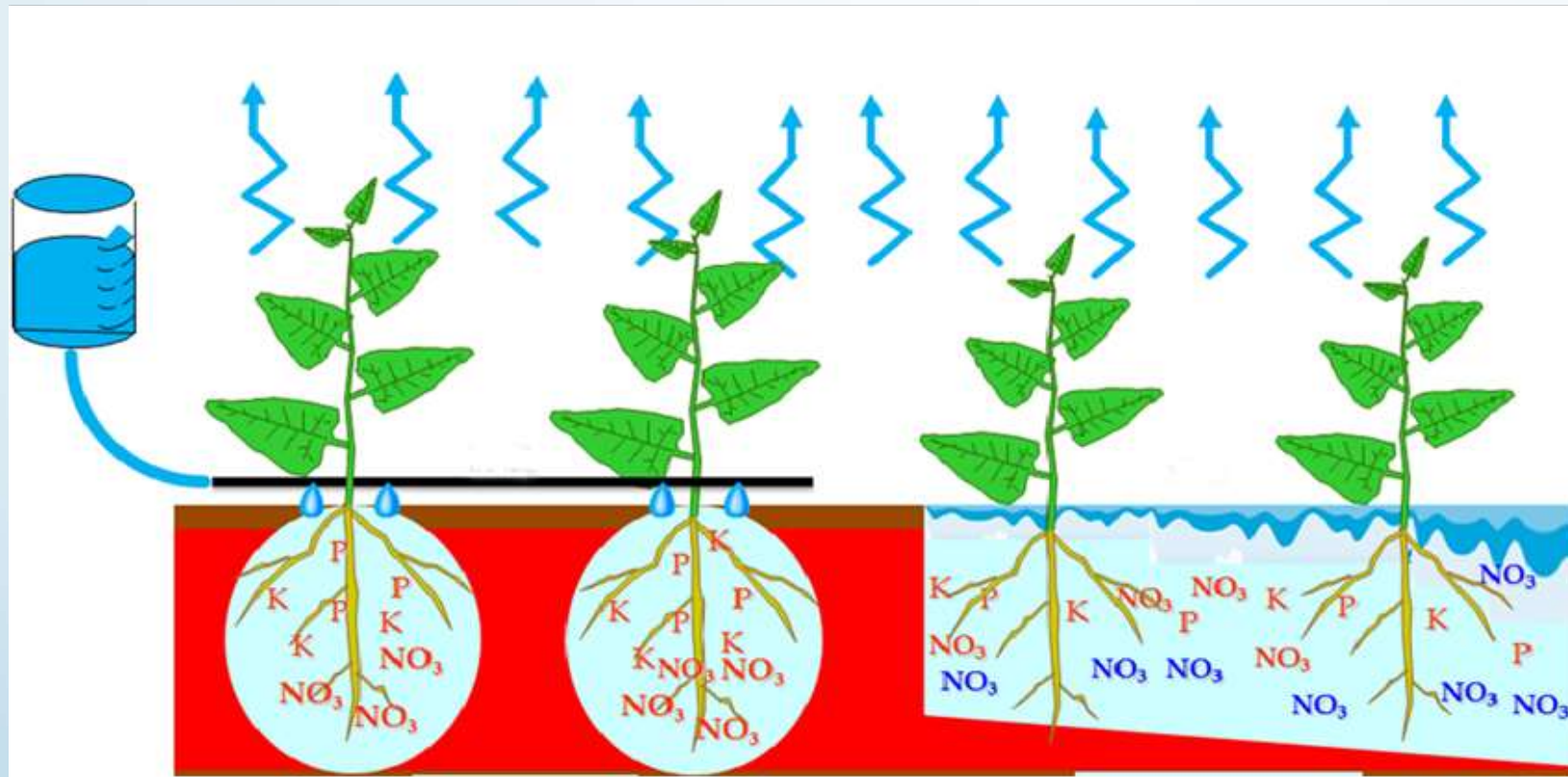
	Source	Media		Disk			Mesh			Separation	Coarse
		1	2	1	2	3	1	2	3	1	1
Drip	surface	◆			◆				◆		◆
	ground	◆	◆		◆			◆		◆	◆
Micro	surface	◆		◆	◆			◆	◆		◆
	ground	◆	◆	◆	◆			◆	◆	◆	◆
Sprinkler	surface	◆		◆			◆				◆
	ground	◆		◆			◆			◆	◆
Watering		◆		◆			◆				◆



Fertigation equipment

Fertigation is the injection of fertilizers, soil amendments, and other water-soluble products into an irrigation system.

Fertigation



Fertigation

Traditional irrigation

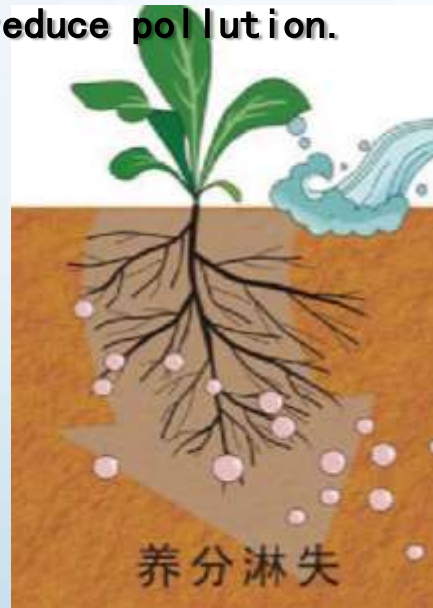
Fertilize and Fertigation

Save: save labour, save fertilizer, save electricity, save water, save land and care free.

Efficiency: increase production, quality and increase income.

Reduce: diseases and insect pests and improve structure of soil, fertilizer, gas and heat.

Low carbon environmental, reduce pollution.



After used fertigation

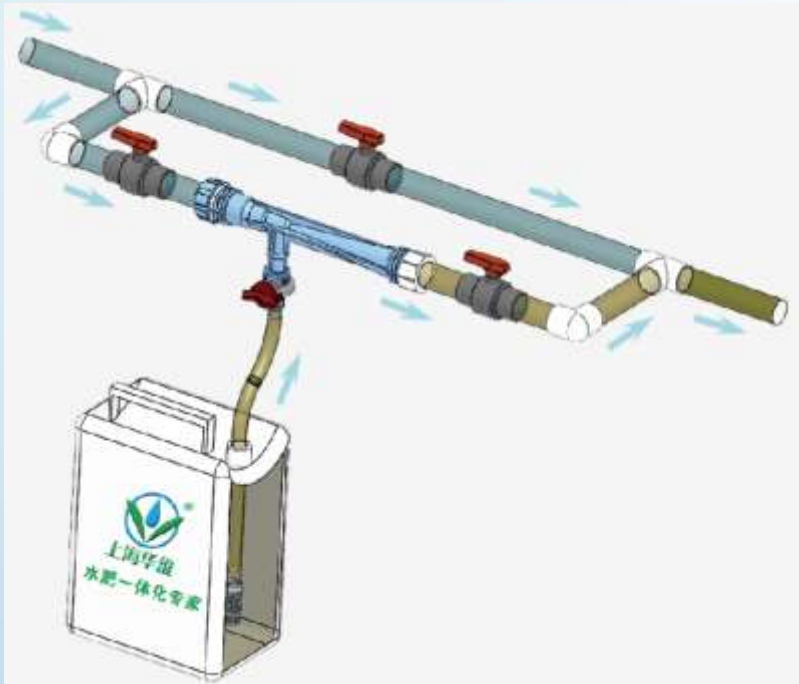


Not Used fertigation

Fertilize injector

- Venturi fertilizer applicator
- Proportional injection (**Ratio dosing**) pump
without power supply
- Full automatic fertigation machine

(1) Venturi injector





Working pressure: no less than 0.15MPa



(2) Dosing pump



Dosatron



Tefen

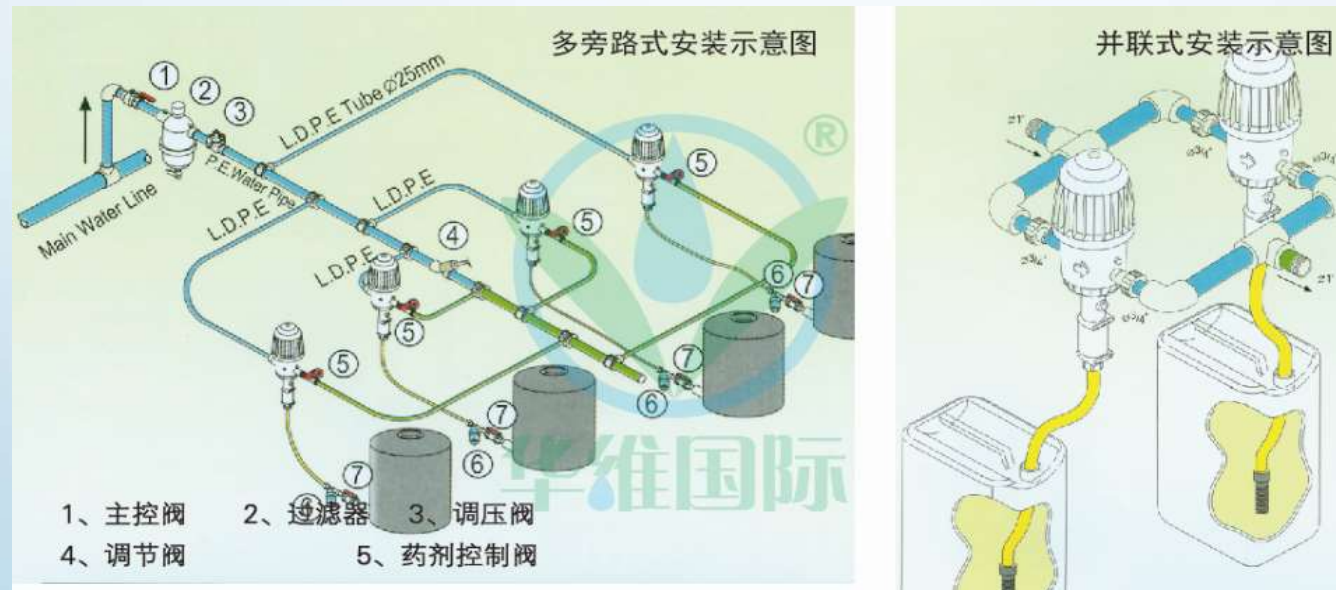
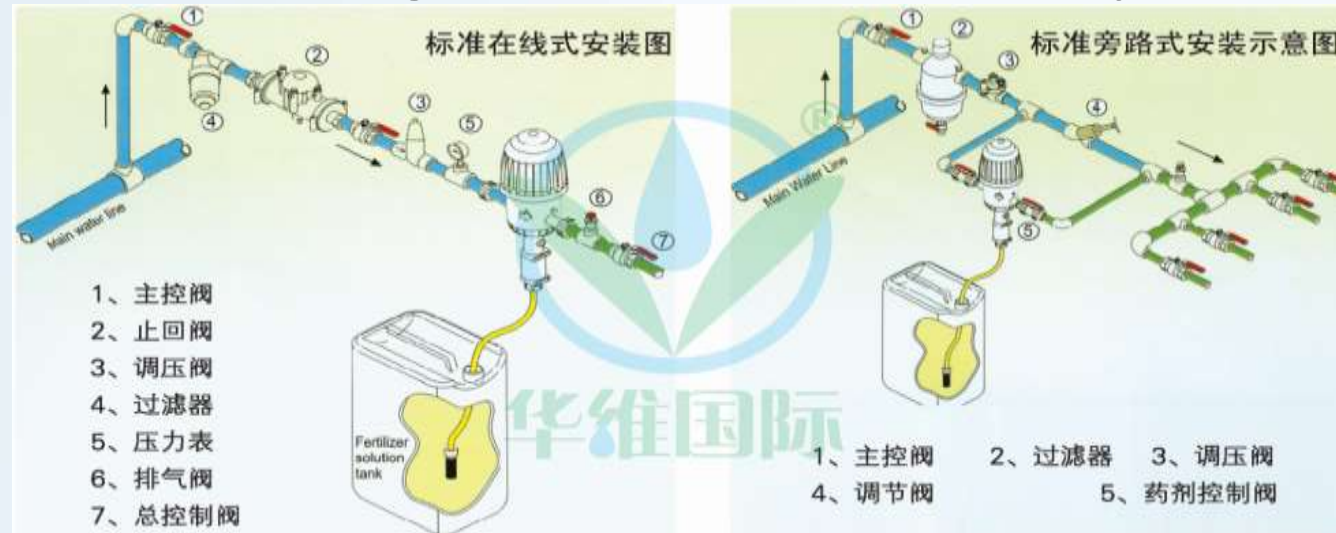
Dosmatic



Dosing Pump



Schematic diagram of proportional injection pump



installing: fixed or movable









3. Fertilizer machine







Automatic fertigation machine

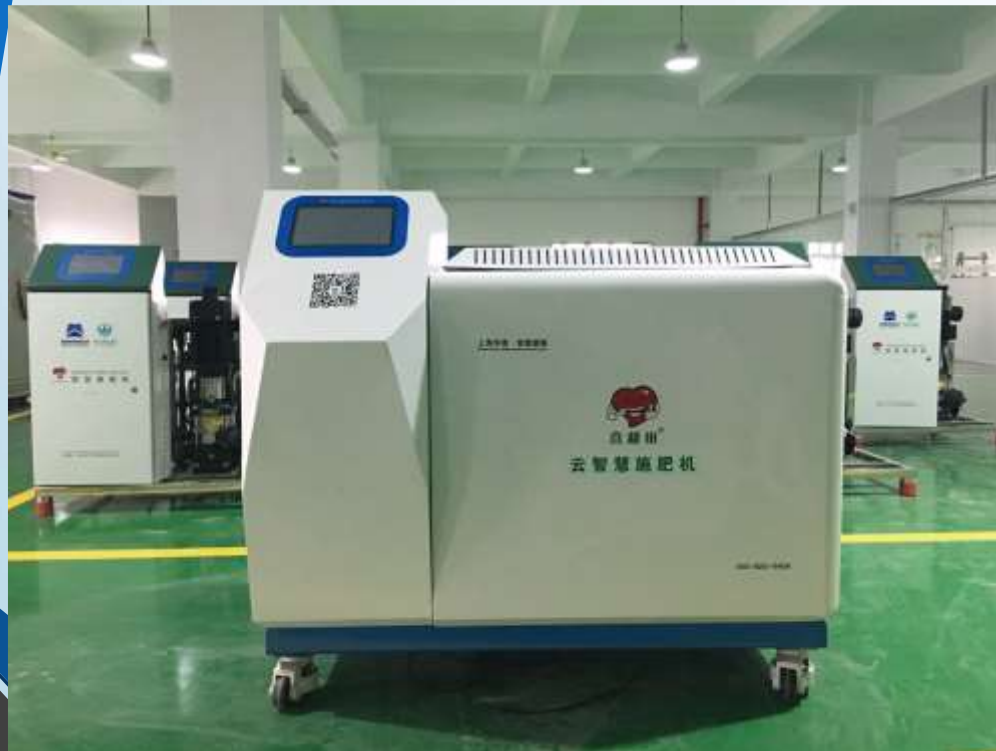
Commonly known as fertilizer applicator, automatic water and fertilizer integration and greenhouse environment control can be fulfilled.

Standard configuration as three channels, fertilizer ratio, generally known as A, B and Acid; according to the actual needs of the owners can increase the fertilization channel.

Automatic program control can be fulfilled, and the number of solenoid valves can be controlled up to hundreds.

Online CE/pH monitoring, to achieve fertilizer ratio, accurate and reliable.

Connecting to internet or does not require personnel to be on duty.



Automatic fertigation machine work animation





CRITERIA FOR APPLYING FERTILISERS

- In addition, the chemicals or fertilizer must be distributed uniformly throughout the field. Achieving such uniformity of distribution requires efficient mixing, uniform water application, knowledge of the flow, characteristics of water and fertilizers in the distribution lines.
 - To avoid clogging, chemicals applied through drip irrigation system must meet certain requirements.
 - The chemicals must be completely soluble. If more than one material is used in preparing a concentrated stock solution for subsequent injection into the drip lines the chemicals must not react with each other to form a precipitate.
 - The chemicals must also be compatible with the salts contained in the irrigation water.
 - The injection points should be provided, one before and one after the filter.
 - This arrangement can be used to bypass the filter if filtering is not required, and thus avoid corrosion damage to the valves and filter screens or to the media filters.
 - Furthermore, the discharge line from the fertilizer tank should have a filter, and similarly, the injection hoses line should be equipped with an filter with screen.
 - The intake or suction side of tile injector should be equipped with a filter or strainer.
 - Injection points must be installed so that injected fertilizers are properly mixed before the flow divides in several directions.
 - The size of capacity of the injection system depends on the concentration, rate and frequency of application.
 - Naturally, less fertilizer solution and more frequent application require smaller, less costly units.
- Fertilizer application rates and application times vary considerably depending on crop and emitter spacing.

Fertigation Manager

- <https://www.wur.nl/en/Research-Results/Projects-and-programmes/Euphoros/Calculation-tools/Fertigation-Manager.htm>
- [Fertigation Manager](#)
- <https://www.agriculture-xprt.com/irrigation/chemigation>

Thank You!



Question?