

User Manual and General Instructions Model: GBL-800YZ (Version 1.0.8.10)

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Abstract: This manual introduces the characters, modules, installation and operation of the GOLDBILL Recirculating Aquaculture System *RAS (GBL-800YZ for freshwater) and matters that require attention during installation and operation.

Keywords:

Product Introduction, Modules, Installation, Common Precautions.

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Contact Information:

Thank you for choosing GOLDBILL-RAS. We are certain that you will be satisfied with our product. Shall you have any comments or suggestions, please feel free to share them with us by following contact channel.



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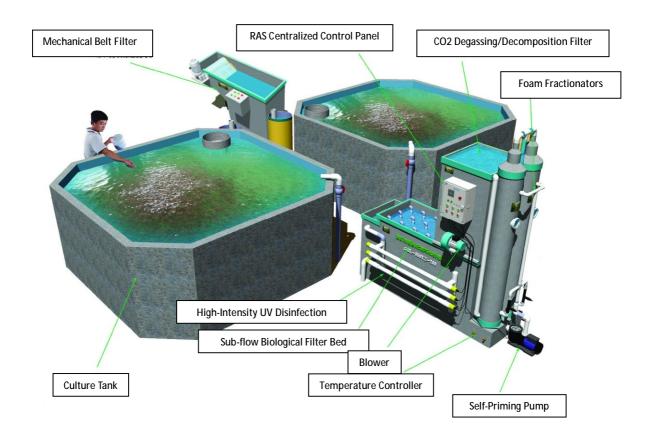
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Introduction:

GOLDBILL modular combined Recirculating Aquaculture System *RAS has combined all the critical treatment processes into one compact machine which are Mechanical filter (solid separation), protein separation (Seawater), Bi Sand-Bed Filtration Reactor (Freshwater), CO₂ Degassing, biological filtration, nitrification and denitrification, Ultraviolet (UV) Disinfection, Oxygenator, and Odor disinfection.

The technology has completely resolved the cost of the traditional complex recycled water system design which caused the needs of large space, pipeline complexity, difficulty of maintenance, high operation costs as well as poor treatment capacity.



^{*}For illustration purpose only



GOLDBILL RAS Modules for Freshwater:

Mechanical Belt Filter:

With the utilization of gravity force, the water will flow into the mechanical belt filter from the fish culture tank outlet. This mechanism will allow the removal of the manure of fish as well as excessive feed which is greater than 10 microns.

2. Self-primping Pump:

The pump with low power consumption will pump/suck the fish tank water from the mechanical belt filter to the foam fractionators. In the meantime, the pressurized water from the pump work as the driven force for the perfect mixing of air and water, which is dual-purpose.

3. RAS Centralized Control Panel:

Centralized switch for Pump, Mechanical Filter, Aerator, UV-Light Disinfector, Water Chiller and Heater.

4. Foam Fractionators (Seawater) / Bi-Flowing Sand Bioreactor (Freshwater):

Removal of more than 90% of small particles below 10 microns as well as soluble organic matter. / Adopt finely ground form of refined quartz sand filter sand bed as the water carrier to achieve the removal of suspended particles and colloidal impurities.

5. CO₂ Degassing/Decomposition Filter:

Elimination of CO₂, Nitrogen gas, Sulfur contents as well as other harmful gas in order to maintain the stability of pH value using the technology of air/water collision principle.

6. Biological Trickling Filter Bed:

Use high-performance biological trickle filter to remove organic matter and ammonia products.

7. Blower:

Provide the sufficient gas for CO₂ degassing mechanism. Increase the dissolved oxygen in water bodies and conciliation functions of temperature.

8. Gas exchanger and efficient bio-filter container:

Second biological treatment use immersion technology, remove ammonia and nitrifying process.

9. Sub-flow biological filter bed:

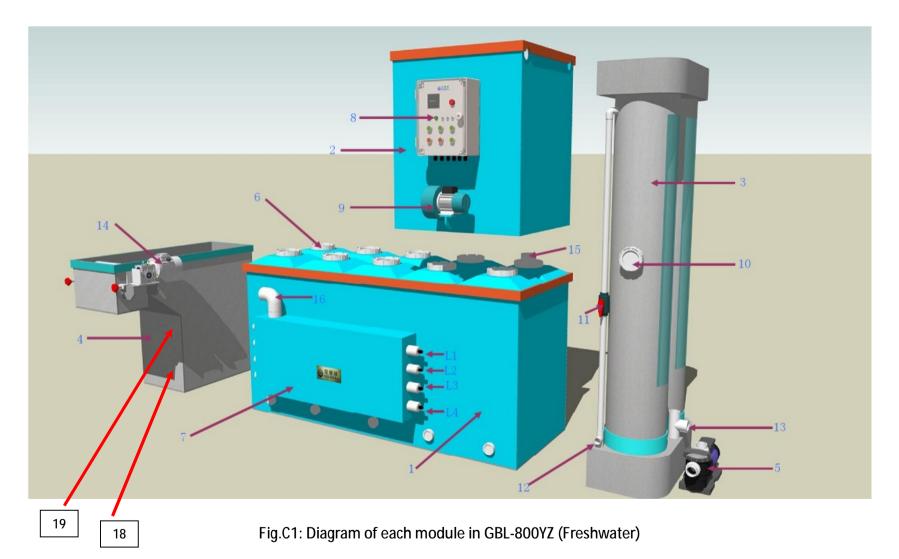
Utilization of imported high-performance suspended biological filter media with 3 stages of advanced treatment for chemical and biological in order to remove ammonia Nitrite and other harmful factors completely.

10. High-intensity UV disinfection device:

Control dynamic distribution of harmful bacteria and parasites elimination.



Hardware Installations: (Components & Connections)



lllustration of Fig.C1:

- 1. Main body (Including the efficiency Bio-filter and UV Modular Tube)
- 2. CO₂ Centrifuge
- 3. Flowing-sand Bioreactor
- 4. Mechanical Belt Filter
- 5. Circulating Pump (AQUA, 1100watt)
- 6. Efficient Bio-filter
- 7. UV Modular Tube (4 Units @ 50watt each)
- 8. Central Electronic Controller
- 9. Blower (120watt)
- 10. Inlet of the Floating-sand Filler
- 11. Switch/Ball Valve
- 12. Sewage outlet
- 13. pipe connection
- 14. Motor (250watt)
- 15. Hole for pipe connection (Between Main Body & CO₂ Centrifuge)
- 16. Outlet pipe (To Culture Tanks *Gravitational Flow with Culture Tanks below RAS Level)
- L1. UV lamp 1
- L2. UV lamp 2
- L3. UV lamp 3
- L4. UV lamp 4
- 17. Washing pump (95watt) (Fixed on the Mechanical belt filter, not shown here, please see Fig.C7)
- 18. Water Level Sensor (Low)
- 19. Water Level Sensor (High)

ldeal Culture Tanks Configuration & Arrangement

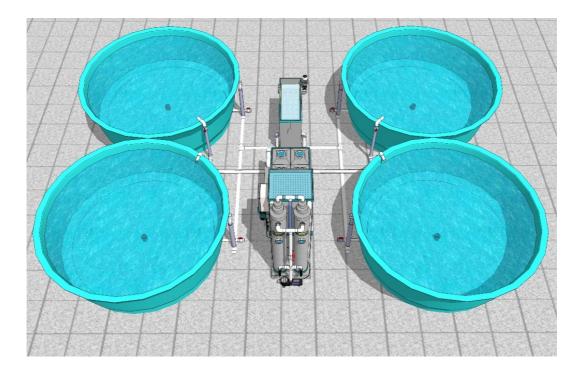


Fig.ID1: Diagram of 4 units of 10ton Tank with GBL-800YZ (Freshwater)

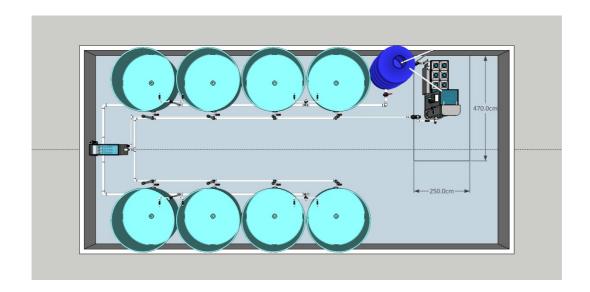


Fig.ID2: Diagram of 8 units of 5ton Tank with GBL-800YZ (Freshwater)

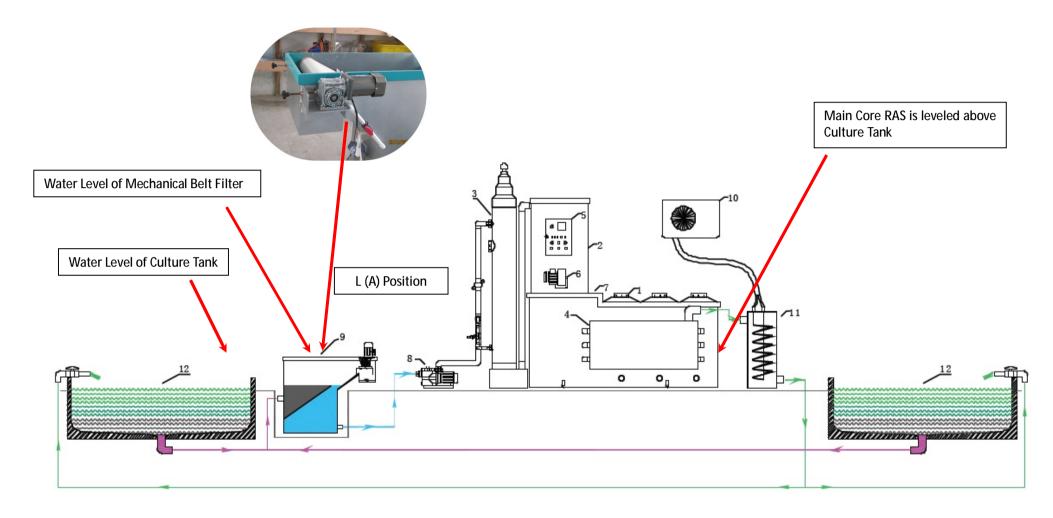


Fig.ID3: Schematic Diagram of Complete System Configuration

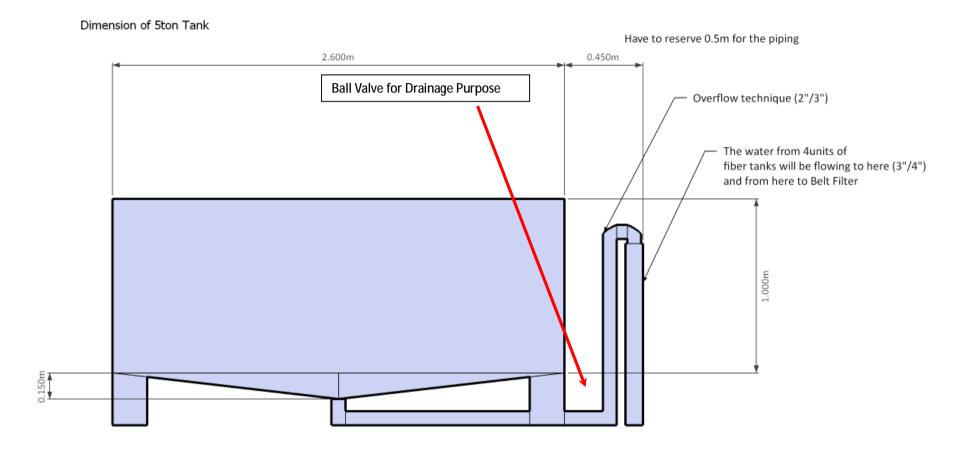


Fig.ID4: Culture Tank Outlet - Recommended Diagram (Water Height @ 85 to 90cm)*

ldeal Culture Tanks Set-Up

- Total volume of water body is equivalent to 40ton (For GBL-800YZ)
- Combination is recommended at *20ton x 2 units or *10ton x 4units (Fig. ID1)
- The greater the quantity of tanks, treatment capacity efficiency will be reduced due to friction losses along the piping configuration
- Main Core RAS is required to level above Culture Tank (Water Tank) in order to apply gravitational flow as shown Fig. ID3
- Mechanical Belt Filter is required to locate at the right level where the water level is the same at L (A) position as shown in Fig. ID3
- Culture Tank is recommended to have outlet piping as shown in Fig. ID4 in order to maintain the water level of each water tank.

Connections must be carried out in following order: (IMPORTANT!)

- 1. Fix the situation of the main body (No.1 in Fig.C1). *Flat ground level
- 2. Place the CO₂ centrifuge (No.2 in Fig.C1) onto the main body, by inserting the pipe (shown in Fig.C2) on the CO₂ centrifuge into the connection hole on the main body (No. 15 in Fig.C1).

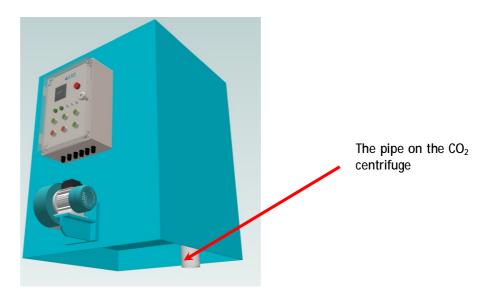


Fig.C2: The pipe on the CO2 centrifuge

3. Put the black porosity plastic Bio-filtration ball into the CO₂ centrifuge, and then cover the water-seal board on the top of CO₂ centrifuge, which is shown in Fig. C3.

*Remarks: The Bio-Filtration Ball and Water-seal Board have been pre-installed



Fig.C3: The plastic Bio-Filtration ball and water seal board.

4. Place the Flowing-sand bioreactor (No.3 in Fig.C1) close to the main body. Connect Pipe-fittings Elbows (Self-prepared Items) to the pipe socket connections in Fig.C4, and then adjust the direction of the Water Pipe Elbow which on the top of the Flowing-sand bioreactor, make sure it is directed toward the CO₂ centrifuge, as shown in Fig.C5.

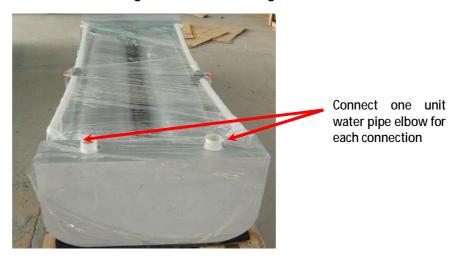


Fig.C4: Connection of pipe fittings elbows



Fig.C5: Adjust direction of water inlet (elbows)

5. Fill-up the sand based filter filler/media into the Flowing-sand bioreactor (Fig.C6).



Fig.C6: Fill the sand into the bioreactor. (Through the side opening)

6. Mechanical Belt Filter (No.4 in Fig.C1) must locate at a fixed situation (flat ground level). The motor (No.14 in Fig.C1) and washing pump (shown in Fig.C7) have been pre-installed on the mechanical belt filter. Please be careful when handle and adjust the tension of belt filter.

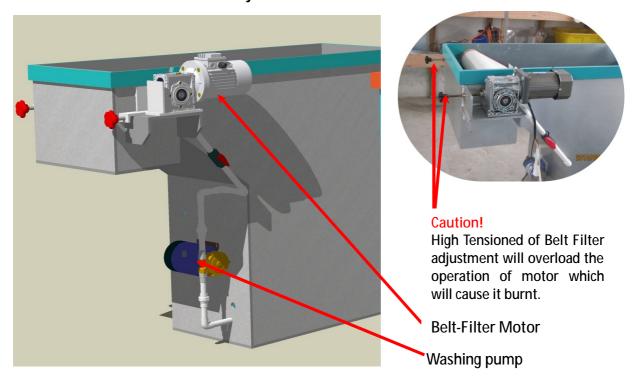


Fig.C7: Washing pump that fixed on the belt filter.

Attention:

There is a rocker switch on the washing pump. Please turn the switch to manual mode instead of auto mode.

7. Piping erection & configuration: PVC pipes & fittings are self-prepared items
(1) Installation Part 1 (Fig.C8-1, Fig.C8-2 and Fig.C8-3):
Pipes & fittings between the Circulating Pump and Flowing-sand bioreactor (ø50), please install a ball valve in between the Circulating Pump and Flowing-sand Bioreactor.



Fig.C8-1: Pipe between the Pump and Flowing-sand bioreactor.



Fig.C8-2: Pipe between the Pump and Flowing-sand bioreactor.



Fig.C8-3 Pipe between the Pump and Flowing-sand bioreactor.

(2) Installation Part 2 (Fig.C9-1and Fig.C9-2):

Connect the pipe between Circulating Pump and Mechanical Belt Filter (ø 50).



Fig.C9-1: Pipe between Circulating Pump and Mechanical Belt Filter.

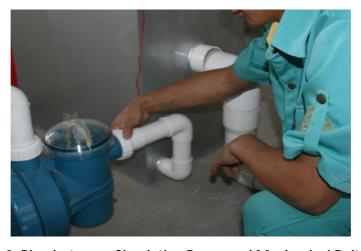


Fig.C9-2: Pipe between Circulating Pump and Mechanical Belt Filter.

(3) Installation Part 3 (Fig.C10):

Connect the pipe between the mechanical belt filter and the culture tank, which is the inlet pipe of GBL-800YZ RAS. (Please refer Fig. ID3 @ Pg.10 and Fig. ID4 @ Pg. 11)



Fig.C10: Pipe between the mechanical belt filter and the culture tank

(4) Installation Part 4 (Fig.C11):

Connect the outlet pipe (ø75) to desired culture tank or culture pond.



Fig.C11: Connect the outlet pipe to your culture tank.*



^{*}Remarks: Culture Tank shall lower in level than main RAS in order for gradational flow to take place. Else leveling pump is required. (Refer Fig. ID4 @ Pg. 10)

(5) Installation Part 5 (Fig.C12-1 and Fig.C12-2):

Connection of the air tube, please connect the air tube to your aerator/blower (oxygen pump) or other aerating apparatus/equipments, as shown in the Fig.C12-1 and Fig.C12-2.



Fig.C12-1 Connection of the air tube

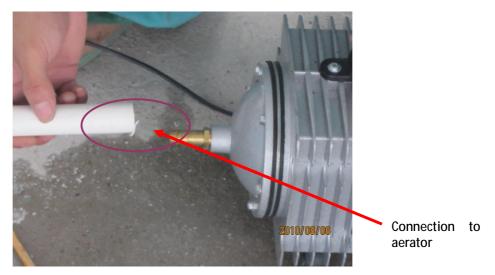
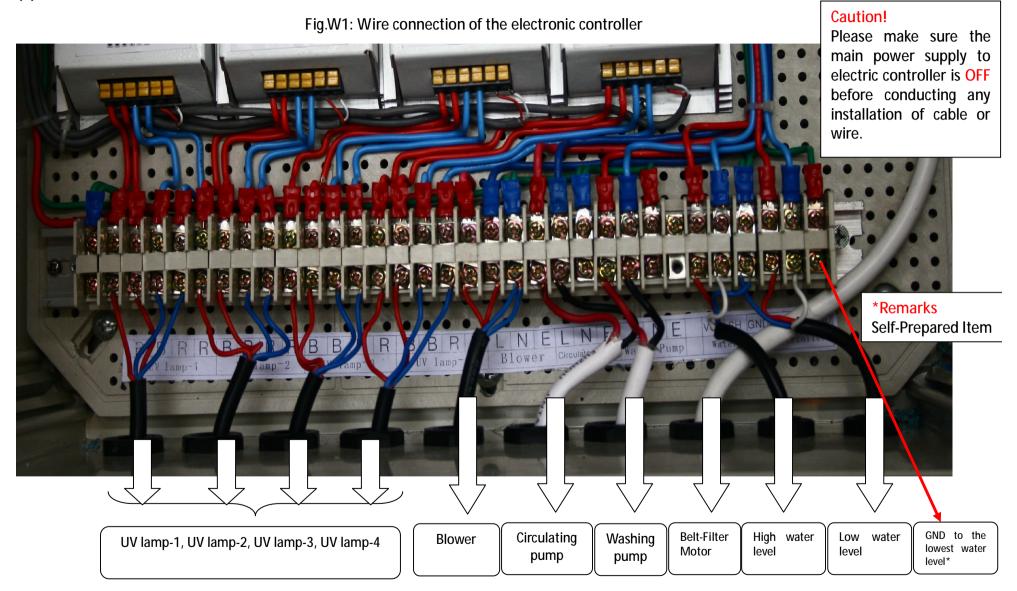


Fig.C12-2 Connect the air tube to Aerator/Air Blower

(6) Installation Part 6 - Wire connection of Electronic Controller:



Features & Menu in Fig.W1:

B: Blue wire

R: Red wire

L: Live wire

N: Null wire

E: Earth wire



Water Level Sensor Connection

VCC: power of high water level——red wire SH: signal of high water level——white wire High water level GND: ground contact——blue wire

VCC: power of low water level——red wire SL: signal of low water level——white wire GND: ground contact——blue wire Low water level

GND: this last GND should connect the lowest water level, which is on the bottom of the mechanical belt filter. (Self-prepared Cable)

Connection of wire to the belt-filter motor (Fig.W2-1 and Fig.W2-2).

There is a plug on the wire from the control box, which should be connected to the motor. And there is a plug too on the wire from the motor. Connect both of the plugs according to the wire color; wire in the same color should be connected together, as shown in Fig.W2-1 and Fig.W2-2.

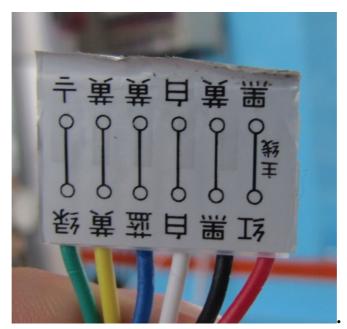


Fig.W2-1: Plug on the wire to motor.

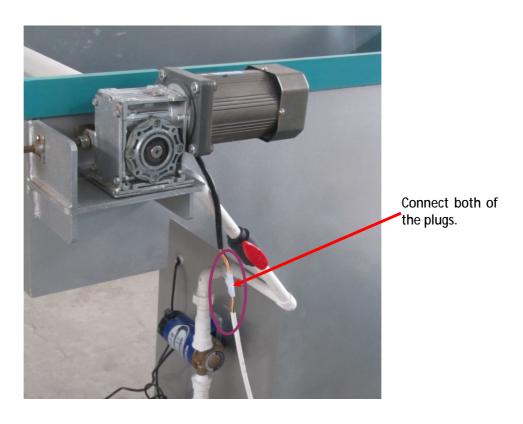


Fig.W2-2: Connection of both of the plugs.

Caution: Please be careful while handling and adjusting the tension of belt filter

- 8. Installation Part 8: UV lamp (Fig.W3-1 and Fig.W3-2):
- (1) First, Install the UV lamp into the system gently (Fig.W3-1).
- *Hollow pipe slot



Fig.W3-1: Installation of UV lamp into the system

(2) Second, tightening the cap lid gently (clockwise) until it's tightened.



Fig.W3-2: Tightening the cap lid on tightly.

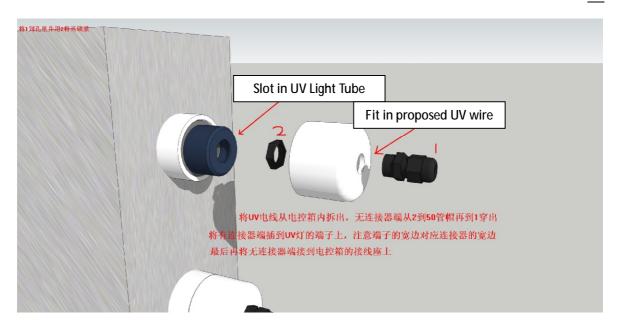


Fig.W3-2: Diagram of UV light components

9. Switch on the power:

When power is switched on, GBL-800YZ RAS shall work properly after several adjustments on the ideal flow rate and setting configuration.

*Remarks: The recommended flow rate is 8 to 10ton/hour

Matters to Be Attention during Installation

- 1. Horizontal position of the main body RAS should higher than the water fish tank. (Fig. ID3)
- 2. The horizontal position of the Mechanical belt filter should not higher than the fish tank. (Fig. ID3)
- 3. The pipe between Mechanical belt filter and water pump should have high seal performance to avoid the circulating pump draws in air by inhaling which will affect the ability of normal operating condition.
- High Tensioned of Belt Filter adjustment will overload the operation of motor which will cause it burnt. (Please make adjustment accordingly, Fig. C7 & W2-2)
- 5. Please make sure the main power supply to electric controller is OFF before conducting any installation of cable or wire. (Fig. W1)
- 6. After installation, be sure to drill a hole in 4-5mm in diameter at the corner block of UV tube outlet, to release any air in the pipe.
- 7. After finished step 4, be sure to seal the hole by using an adjuster.



Operation Instructions

- 1. This system supports the maximum Recirculating aquaculture water of 40 tons and the designed circulation water volume is 8-10 tons/hour. Do not overload the operating condition, in order to avoid losses in efficiency. (Proposed Biomass: 35 to 45 kg dependable on culture species)
- Before installation to tank for circulating usages (stocking), you must add
 the special bacteria to biochemical system and keep it self-running for 20
 to 30 days, make sure the ultraviolet ray decontamination system is
 closed during this period.
- 3. Ensure that the power source is stable, especially comes from a generator etc. it is important that GBL-800 is not connected to power during start-up or shut-down of such equipment. (Stand-by generator & etc.)
- 4. Never add-in any antibiotic or disinfection medicine to the water body during the operating process.
- 5. Do not lid-up or open the UV light cover cap to examine while the ultraviolet ray tube is in operating condition, as it is harmful to humans' eyes.
- 6. The water flow rate should be controlled at certain speeding order to avoid overflow of floating-sand sand based filler/media.

