

inverFLOW PLUS



Installation Manual



**PLEASE READ THE MANUAL
CAREFULLY BEFORE INSTALLATION
& OPERATION AND RETAIN IT FOR
FUTURE REFERENCE.**



Adherence to the directions for use in this manual is extremely important for health and safety. Failure to strictly adhere to the requirements in this manual may result in personal injury, property damage and affect your ability to make a claim under the manufacturer's warranty provided with your product. Products must be used, installed and operated in accordance with this manual. You may not be able to claim on the manufacturer's warranty in the event that your product fault is due to failure to adhere this manual.

INSULATED WET END PUMP.
USE COPPER CONDUCTORS ONLY.
FOR USE WITH SWIMMING POOLS, HOT TUBS, AND SPAS.
CAUTION: CONNECT ONLY TO GROUNDING TYPE RECEPTACLE PROTECTED BY
A CLASS A GROUND FAULT CIRCUIT INTERRUPTER.
CAUTION: TO ENSURE CONTINUED PROTECTION AGAINST SHOCK HAZARD,
USE ONLY IDENTICAL REPLACEMENT PARTS WHEN SERVICING.
CAUTION: THIS PUMP IS FOR USE WITH PERMANENTLY-INSTALLED POOLS
ONLY - DO NOT USE WITH STORABLE POOLS.

1 | IMPORTANT SAFETY INSTRUCTIONS



This guide provides installation and operation instructions for this pump.
If you have any other questions about this equipment, please consult your supplier.

1. 1 When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

- READ AND FOLLOW ALL INSTRUCTIONS.
- WARNING -To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
 - WARNING -Risk of Electric Shock. Connect only to a branch circuit protected by a ground-fault circuit interrupter (GFCI). Contact a qualified electrician if you cannot verify that the circuit is protected by a GFCI.
 - The unit must be connected only to a supply circuit that is protected by a ground-fault circuit interrupter (GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push the reset button. Power should be restored. If the GFCI fails to operate in this manner, the GFCI is defective. If the GFCI interrupts power to the pump without the test button being pushed, a ground current is flowing, indicating the possibility of an electric shock. Do not use this pump. Disconnect the pump and have the problem corrected by a qualified service representative before using it.
 - WARNING -To reduce the risk of electric shock, replace the damaged cord immediately.
 - CAUTION -This pump is for use with permanently installed pools and may also be used with hot tubs and spas if so marked. Do not use it with storable pools. A permanently installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it is capable of being readily disassembled for storage and reassembled to its original integrity.
 - Do not install within an outer enclosure or beneath the skirt of a hot tub or spa.
 - A solid copper bonding conductor not smaller than 8 AWG (1 /32") shall be connected from the accessible wire connector on the motor to all metal parts of the swimming pool, spa, or hot tub structure and to all electrical equipment, metal conduit, and metal piping within 5 feet (7 .5 m) of the inside walls of a swimming pool, spa, or hot tub, when the motor is installed within 5 feet of the inside walls of the swimming pool, spa, or hot tub.
 - For Use with Swimming Pools, Hot Tubs, and Spas.
 - CAUTION: This Pump is for Use with Permanently-Installed Pools Only -Do Not Use with Storable Pools.
 - CAUTION: To reduce the risk of electric shock, install at least 5 feet from the inside walls of a pool. Do not use an extension cord.
 - CAUTION: To ensure continued protection against shock hazard, use only identical replacement parts when servicing.
 - This pump is for use with permanently installed in-ground or above-ground swimming pools and may also be used with hot tubs and spas with a water temperature under 50°C
 - Due to the fixed installation method, this pump is not suggested to be used on above-ground pools that can be readily disassembled for storage.
 - The pump is not submersible.
 - Never open the inside of the drive motor enclosure.
 - SAVE THESE INSTRUCTIONS.



WARNING:

- Fill the pump with water before starting. Do not run the pump dry. In case of dry run, mechanical seal will be damaged and the pump will start leaking.
- Before servicing the pump, switch power OFF to the pump by disconnecting the main circuit to the pump and release all pressure from pump and piping system.
- Never tighten or loosen screws while the pump is operating.
- Ensure that the inlet and outlet of the pump are unblocked with foreign matter.

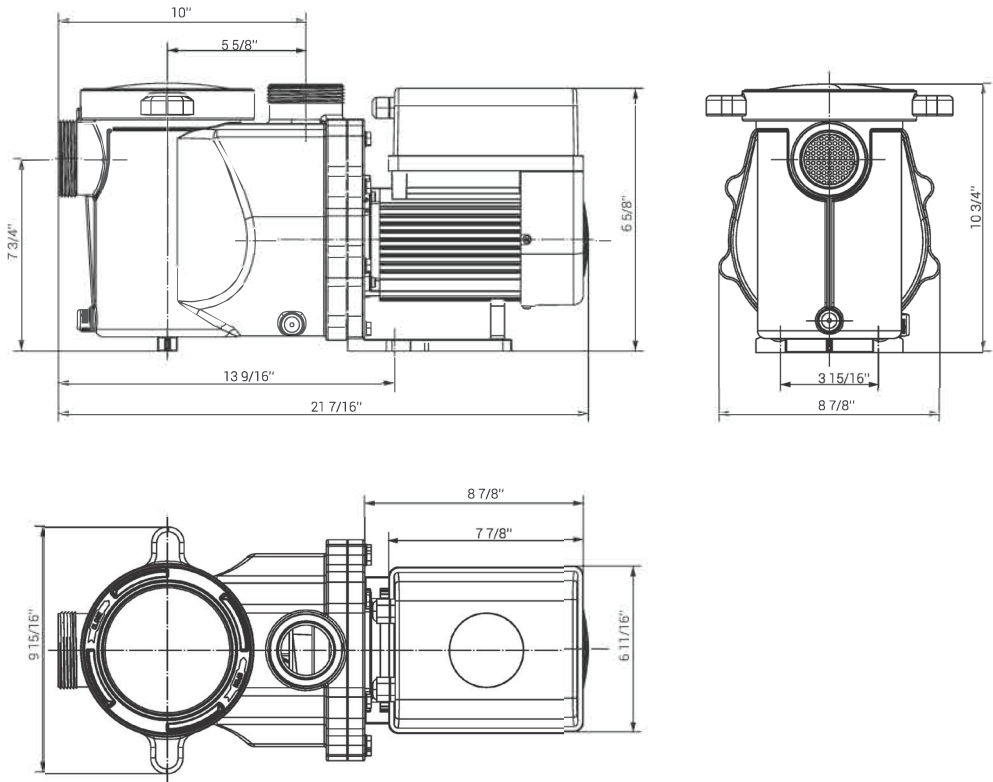
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2 | TECHNICAL SPECIFICATIONS

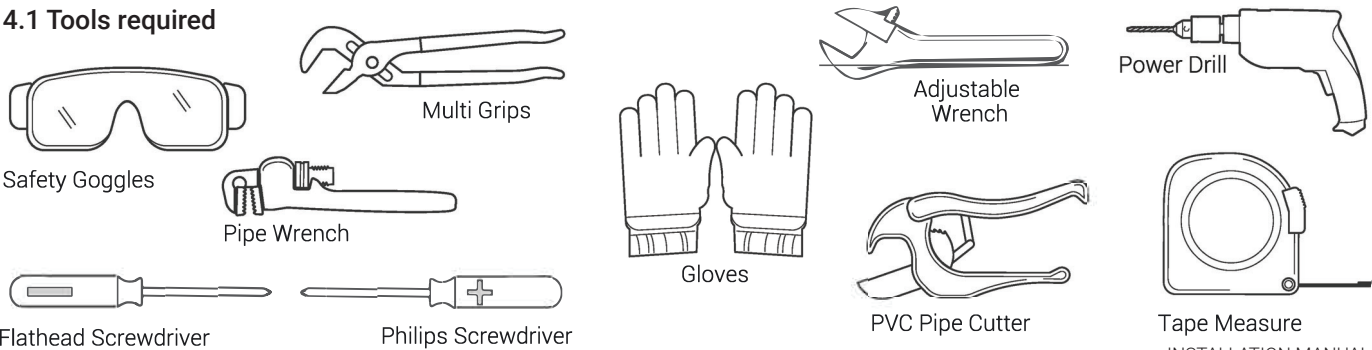
Model	Name	THP	Voltage (V/Hz)	Input Voltage (V)	Current (A)	Qmax(GPM)
21101	Inverflow Plus 1HP VSP	1	115/230v 60Hz	230	4.6	110
				115	8.3	112
21102	Inverflow Plus 1.5HP VSP	1.5		230	5.9	114
				115	8.7	125
21103	Inverflow Plus 2HP VSP	2		230	6.5	123
				115	9.6	136

3 | OVERALL DIMENSION



4 | INSTALLATION

4.1 Tools required



4.2 Pump Location

The pump should be installed in an area with at least 6” distance around the unit away from any obstacles and away from any corrosive products.

- 1) Install the pump as close to the pool as possible, to reduce friction loss and improve efficiency, use short, direct suction and return piping.
- 2) To avoid direct sunshine, heat or rain, it is recommended to place the pump indoors or in the shade.
- 3) DO NOT install the pump in a damp or non-ventilated location. Keep pump and motor at least 6” away from obstacles, pump motors require free circulation of air for cooling.
- 4) The pump should be installed horizontally and fixed in the hole on the support with screws to prevent unnecessary noise and vibration.

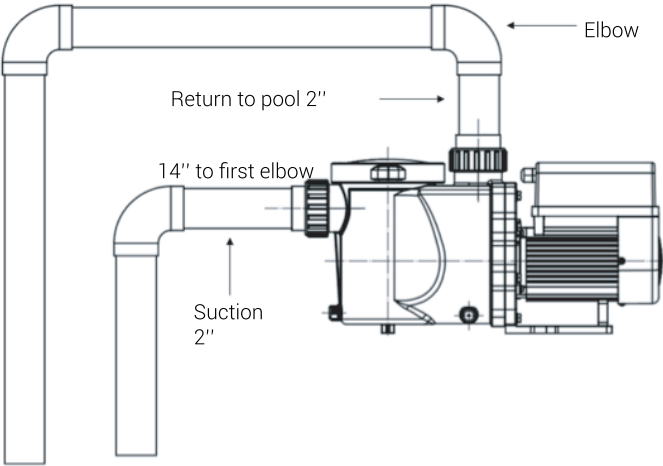
4.4 Valves and Fittings

It is recommended to install isolation valves on the suction and return lines for easier maintenance of the pool pump. Elbows should be no closer than 14” to the inlet. Do not install 90° elbows directly into the pump inlet/outlet. Joints must be tight.

4.3 Piping

Suction and return connections on the pool pumps are 2” pressure pipe dimensions.

- 1) For optimization of the pool plumbing, it is recommended to use a pipe with size of 2”. When installing the inlet and outlet fittings Qoints),use the special sealant for PVC material.
- 2) The dimension of suction line should be the same or larger than the inlet line diameter, to avoid pump sucking air, which will affect the efficiency of the pump.
- 3) Plumbing on the suction side of the pump should be as short as possible.
- 4) For most installations we recommend installing a valve on both the pump suction and return lines, which is more convenient for routine maintenance. However, we also recommend that are valve, elbow, or tee installed on the suction line should be no close to the front of the pump than seven times the suction line diameter
- 5) Pump outlet piping system should be equipped with a check valve to prevent the pump from the impact of medium recirculation and pump-stopping water hammer.



- * The pump inlet/ outlet union size: optional with imperial 1.5” or 2”.
- 2) Below water level system should have an isolation valves installed on suction and return line for maintenance; however, the suction gate valve should be no closer than seven times the suction pipe diameter as described in this section.
- 3) A check valve should be installed if there are long pipe runs above water level or if is significant height between the return line and the outlet of the pump.
- 4) Be sure to install check valves when plumbing in parallel with other pumps. This helps prevent reverse rotation of the impeller and motor.

4.5 Check before initial startup

- 1) Check whether pump shaft rotates freely;
- 2) Check whether power supply voltage and frequency conform to the nameplate;
- 3) Facing the fan blade, the direction of motor rotation should be clockwise;
- 4) It is forbidden to run the pump without water.

4.6 Application conditions

Ambient temperature	Indoor installation, temperature range: -14°F~104°F
Water temperature	41°F~122°F
Salt pools	Up to 3.5%, i.e. 35g/L(35000 ppm)
Humidity	≤ 90% RH, (68°F±7°F)
Altitude	Not exceed 3280ft above sea level
Installation	The pump can be installed max. 6ft above water level
Insulation	Class F, IP55

5 | SETTING AND OPERATION

5.1 Display on control panel



1	Running capacity / power display
2	Running capacity / power indicator
3	Timer indicator 1/2/3/4
4	Wifi indicator

	Unlock/ Boost
 	UP DOWN To change the value of the setting.
	Timer setting
	On/ Off

5.2 Startup

When the power is switched on, the screen will fully light up for 3 seconds, the device code will be displayed, and then it will enter the normal working state. When the screen is locked, only the button (B) will light up; Press and hold (B) for more than 3 seconds to unlock the screen. The screen will automatically lock up when there is no operation for more than 1 minute and the brightness of the screen will be reduced to 1/3 of the normal display. Short press (B) to wake up the screen and observe the relevant operating parameters.

5.3 Self-priming

Each time the pump is started, it will start self-priming.

When the pump performs self-priming, it will count down start from 25mins display 00:25 and stop count down automatically when the system detects the pump is full of water, then the system will recheck for 2mins display 00:02 again to make sure the self-priming is completed.

User can exit self-priming manually by pressing (B) for more than 3 seconds. The pump will run at the default 80% speed

Remark:

- 1) The pump is delivered with self-priming enabled. Each time the pump restarts, it will perform self-priming automatically. Users can enter the parameter setting to disable the default self-priming function in parameter 6(see 5.8)
- 2) Users can enter the parameter setting to adjust the self-priming recheck time in parameter 7 (see 5.8)

5.4 Running Capacity Setting

1		Hold for more than 3 seconds to unlock the screen.
2		Press to start. The pump will run at 80% of the running capacity at the initial startup after the self-priming.
3	 	Press or to set the running capacity between 30%~100%, each step by 5%. For the purpose of backwashing, users can set a high running capacity according to the size of filter.
4		Hold for more than 3 seconds to read the real-time power.

5.5 Timer mode

The pump’s on/off and running capacity could be commanded by timer, which could be programmed daily as needed. Maximum 4 timers can be set on the control panel.

1	Enter timer setting by pressing .
2	Press or to set the local time. Press to confirm and move to timer-1
3	When enter the timer-1 setting, the timer indicator 1 will light up. "StA" will be shown on the screen. Press to proceed and then press or to set the start time of timer-1 (with 30 minutes for each step), press to confirm.
4	When the start time of timer 1 is confirmed, "End" will be shown on the screen. Press to proceed and then press or to set the end time of timer-1 (with 30 minutes for each step), press to confirm.
5	When the end time of timer 1 is confirmed, "SPd" will be shown on the screen. Press to proceed and then press or to set the running capacity of timer-1 (30% - 100%, each step by 5%), press to confirm.
6	When the timer 1 setting is completed, repeat steps 3 – 5 to complete the setting of timer 2 – 4.

5.6 Boost mode

User can enter the Boost mode by short pressing . The pump will run at 100% speed for 1 hour (the speed can be modified in parameter setting 4, and the countdown will be displayed on the display. (see 5.8)
During operation, the user can adjust the running time (default 1 hour) by pressing both . The adjustment range is 00:00-24:00, and the step is 15 minutes. After adjustment, the system automatically saves the current value and operates according to the adjusted time, and the next time it enters the Boost mode, it will still run according to the last set time value.
When the countdown ends, or hold for 3 seconds, the boost mode will be exited and the pump wil return to the previous running state.

Note:

- a. When the running capacity is adjusted, the system will save the latest parameter automatically.
- b. When setting 100% speed, the pump will increase the speed automatically if the pipeline resistance is high, but will not exceed the rated power of each model.

Note:

- 1). When timer mode is activated, if the set time period contains the current time, the pump will start running according to the set running capacity and the corresponding timer indicator (7 or 2 or 3 or 4) will stay on, and the set running capacity will be shown on the screen.
- 2).If the set time period does not contain the current time, the timer indicator (7 or 2 or 3 or 4) that is about to start running will light up and flash, and the current time will be shown on the screen.
- 3).All 4 time periods should be set in chronological order. Overlap setting of time will be considered invalid, the pump will only run based on the previous valid setting.
- 4).During the timer settin , if users want to return to the previous setting item, hold both for 3 seconds. If users don’t need 4 timers, they can hold for 3 seconds after completing the setting of the specific timer, the system will automatically save the current set value and activate the timer mode.
- 5).When the timer mode is activated, users can adjust the running capacity for temporary use by pressing or until the set time period of the timer end.
- 5.1 If the set time period of the timer contains the current time, users can adjust the running capacity for temporary use by pressing or until the set time period of the timer end.
- 5.2 If the set time period of the timer does not contain the current time, users can adjust the running capacity for temporary use by pressing or until the next set time period of the timer start.
- 6).Users can hold for 3 seconds to read the real-time power and exit timer mode by holding for 3 seconds.

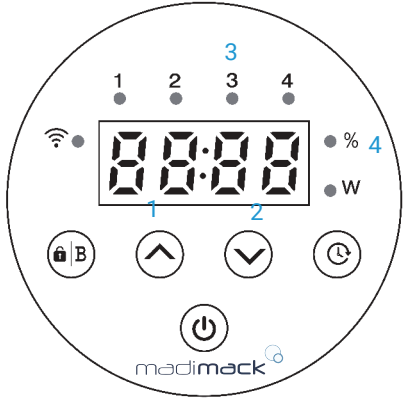
5.7 Skimmer mode

The skimmer mode enables the pump to skim the water surface, prevents the debris from accumulating, and provides users with a cleaner pool.

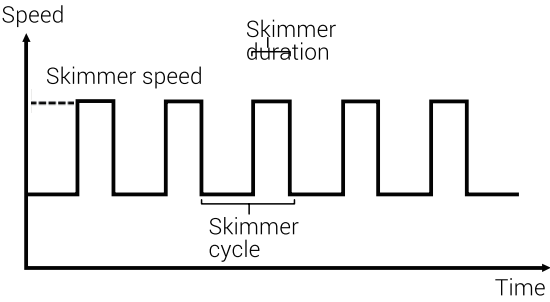
Hold and to enter the preset interface of the skimmer mode, press or to view the 3 presets, the selected preset will be

Activate Skimmer Mode:

- 1. Unlock the screen, press both for 3s to enter the preset interface of the skimmer mode;
- 2. Press or to select the presetting from 1-4, the selected presetting will be activated after 5s without operation.
- 3. When skimmer mode is activated, the controller will exit the preset interface and display normal running state.



- 1. Skimmer cycle (hour)
- 2. Skimmer duration (minute)
- 3. Skimmer mode preset number
- 4. Skimmer speed



Details of the presetting:

Preset	Skimmer cycle	Skimmer duration	Skimmer speed	Time period	Remarks
1	1h	3 min	100%	7:00 - 21:00	Editable in parameter setting
2	1h	10 min	100%	7:00 - 21:00	Not editable
3	3h	3 min	80%	7:00 - 21:00	Not editable
4	Cancel the skimmer mode				Not editable

5.8 Parameter Setting

Restore factory setting.	Under off mode, hold both for 3 seconds.
Check the software version.	Under off mode, hold both for 3 seconds.
Enter parameter setting as shown.	Under OFF mode, hold both for 3 seconds to enter the parameter setting. The parameter address (on the left) and default setting value (on the right) will flash alternately on the screen. Users can press or to adjust the current value, and hold for 3 seconds to the next parameter address. It will exit the parameter setting after 10 seconds without operation.

Parameter Address	Description	Default Setting	Setting Range
1	Digital input 2	100%	30~100%, by 5% increments
2	Digital input 3	80%	30~100%, by 5% increments
3	Digital input 4	40%	30~100%, by 5% increments
4	Boost mode speed	100%	80~100%, by 5% increments

5	Reserve	/	/
6	Enable or disable the priming that occurs at start.	25	25:enables 0:disable
7	Self-priming recheck time	2min	1-15min by 1min increments
8	System time	00:00	Hour: 0-24h, step:1h Min: 0-59min, step 1min
9	Skimmer cycle time, execution time, execution speed (Preset 1)	01 : 00 00: 03 100%	Cycle range : 1-24h, by 1h increments Execution time Range: 1-30min, by 1min increments execution time Range: 30%-100%, by 5% increments
10	Skimmer mode effective period (Preset 1)	07:00-21:00	Start time: hour: 0-24h, by 1h; Minute: 0-59min, by 1min End time: hour: 0-24h, by 1h; Minute: 0-59min, by 1min
11	Speed limit	100%	60-100% in step of 5%
12	RS485 address	170 (0xAA)	160-191(0xA0-0xBF), by 1 increments
13	Reserve	/	/

1 iGarden Download



Android™

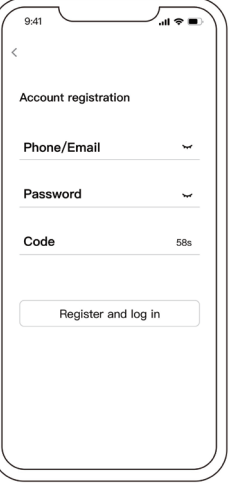
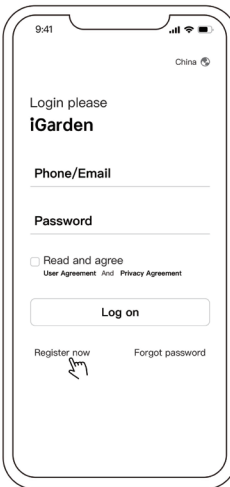


iOS™



2 Account registration

Phone/Email registration



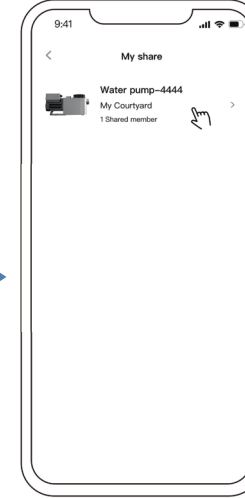
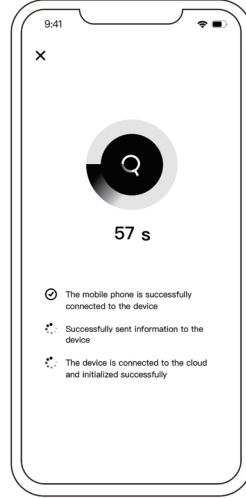
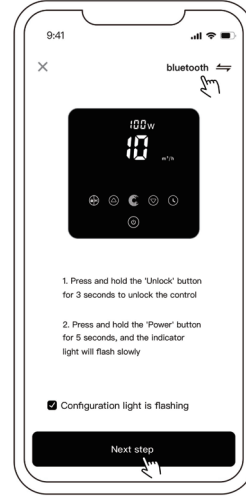
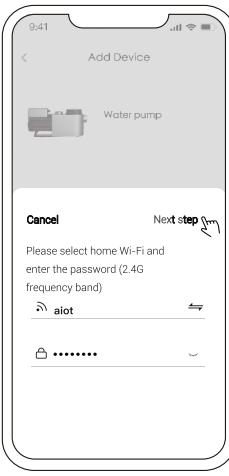
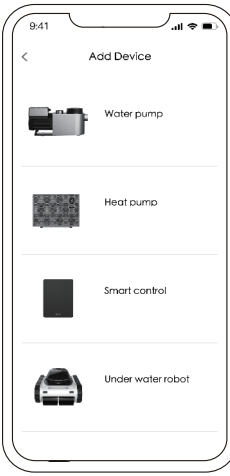
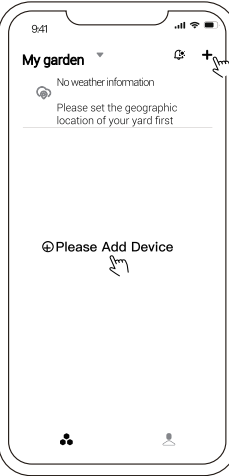
3 App pairing

Please make sure your pump is turned on before you start.

WiFi and Bluetooth

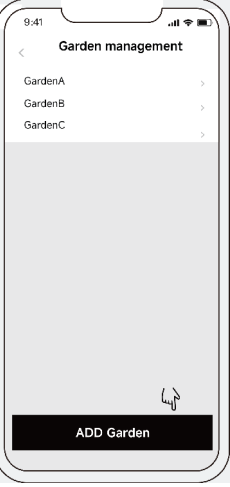
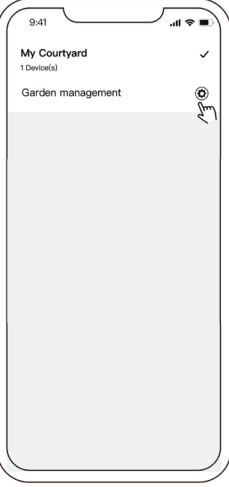
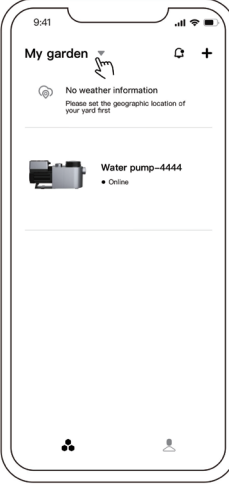
Pool pump WiFi only compatible with 2.4Ghz band and combined 2.4/5Ghz band.

- 1) Please ensure your phone is connected to the home WiFi and has a strong connection at the pool pump location. Also, please enable Bluetooth.
- 2) First, Unlock the screen by holding the Unlock button for 3seconds until a beep noise can be heard and the screen is illuminated.
- 3) Press button, (for 5 seconds) until hearing a beep, then release and will flash.
- 4) Click "Add Device"



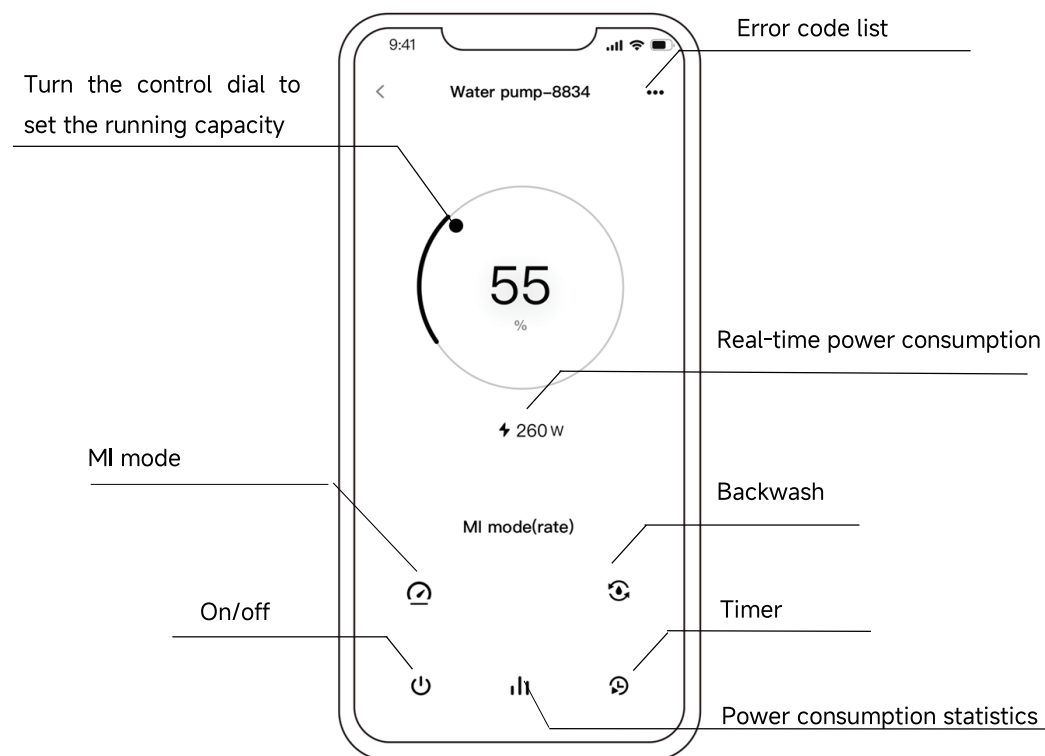
4 Garden Management

In the device list, the current courtyard is displayed. After clicking, you can view/switch-all the current courtyards, click Garden Management, and you can also enter the courtyard list page. As shown below:

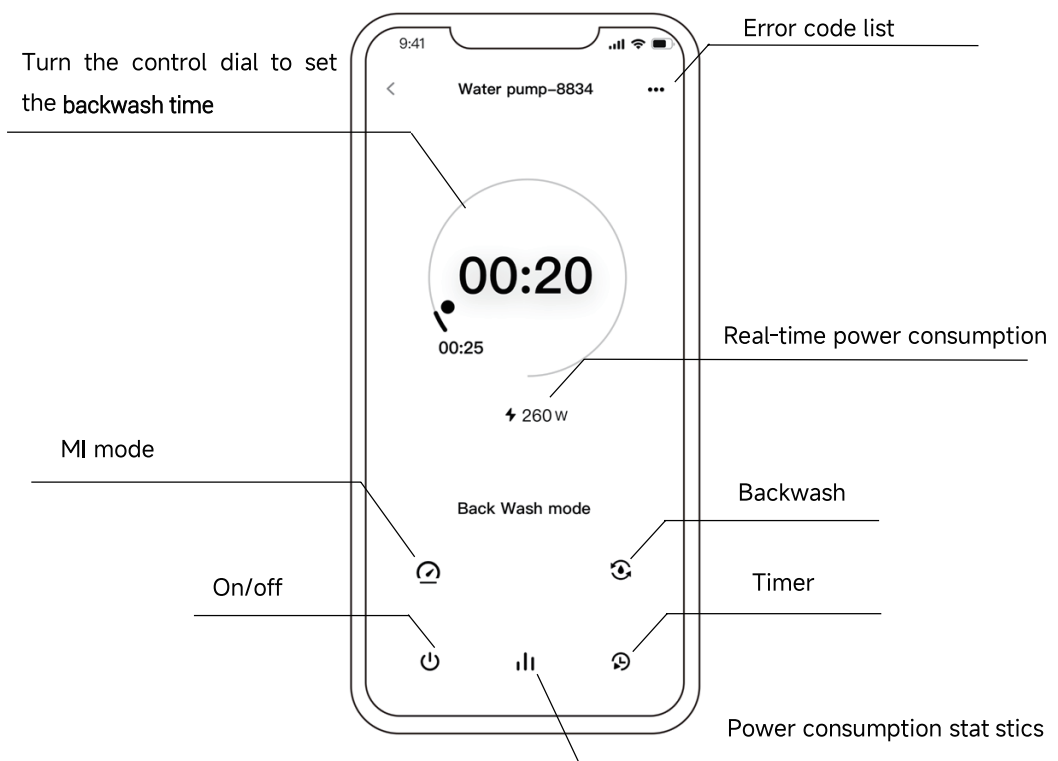


5 Operation

1) Using Manual Inverter mode:

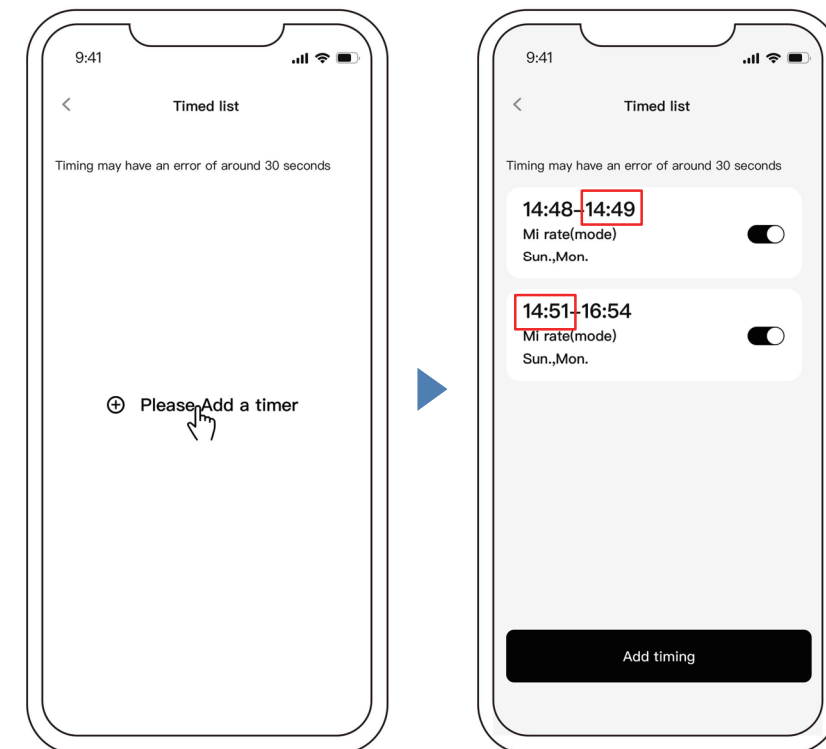


2) Using Backwash mode:



Notice for the timer setting via the APP:

- 1) Time variance is $\pm 30s$;
- 2) In order to avoid overlapping timing points conflicting and invalidating due to network delay, it is recommended that the end time and the start time of the next timing period cannot overlap, and a sufficient time interval should be reserved, for example, at least 2 minutes;



6

Sharing Devices with your family members

After pairing, if your family members also want to control the device, please let your family members register” iGarden” first, and then the adminstrator can operate as below:

7

Feedback

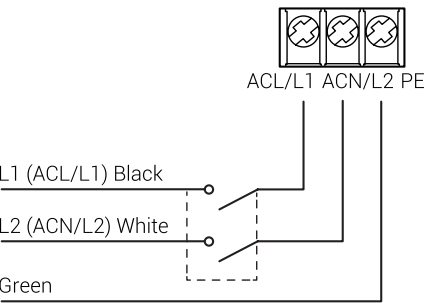
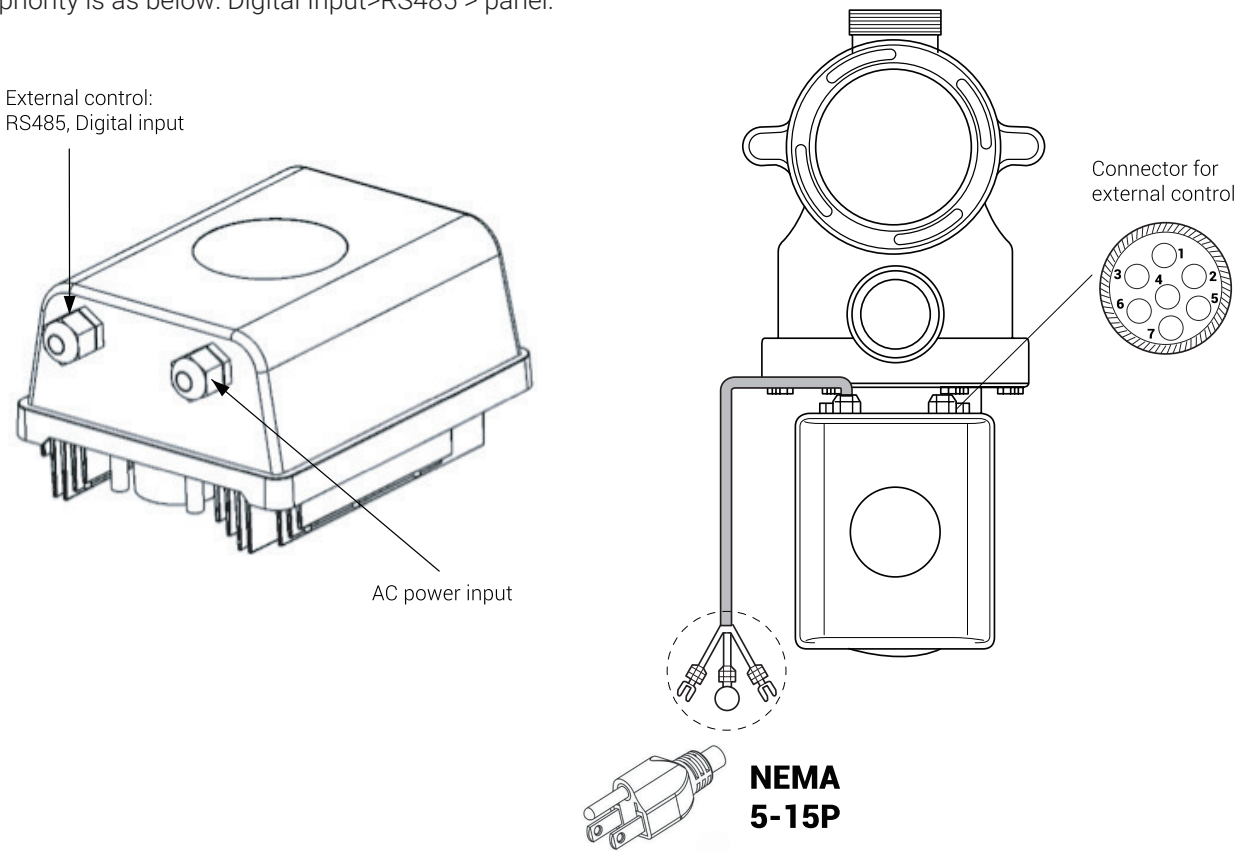
If you have any problem while using, welcome to send feedback.

Notice:

- 1) Weather forecast is just for reference;
- 2) The power consumption data is for reference only, as it may be affected by network problems and imprecision of the calculation.
- 3) App is subject to updates without notice.

7 | EXTERNAL CONTROL

External control can be enabled via following contacts. If more than one external control is enabled, the priority is as below: Digital Input>RS485 > panel.



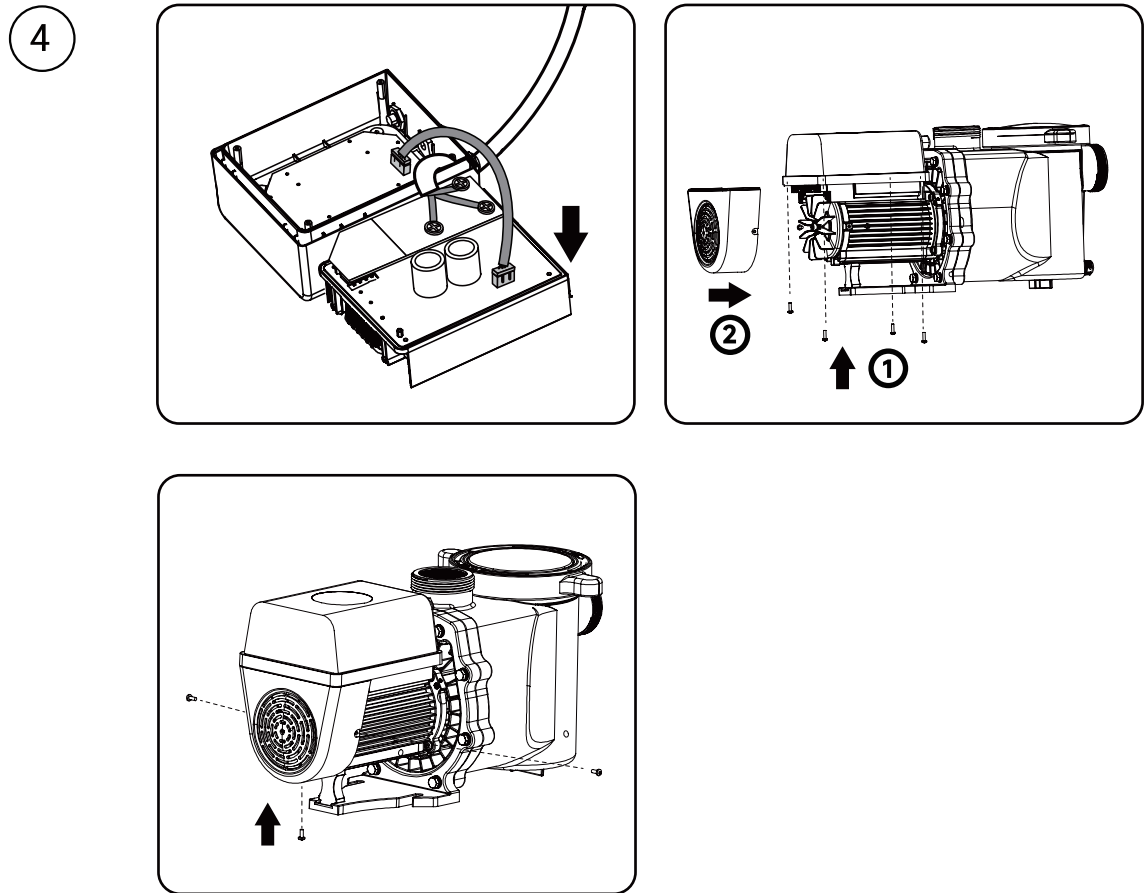
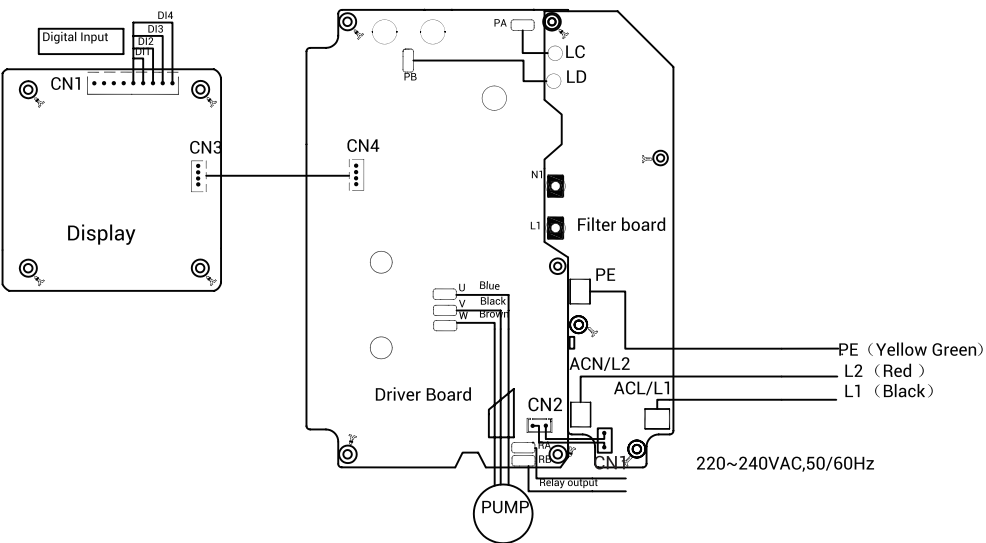
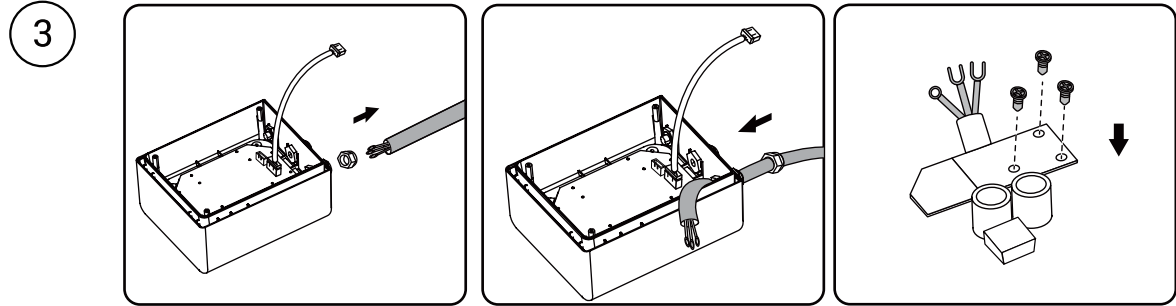
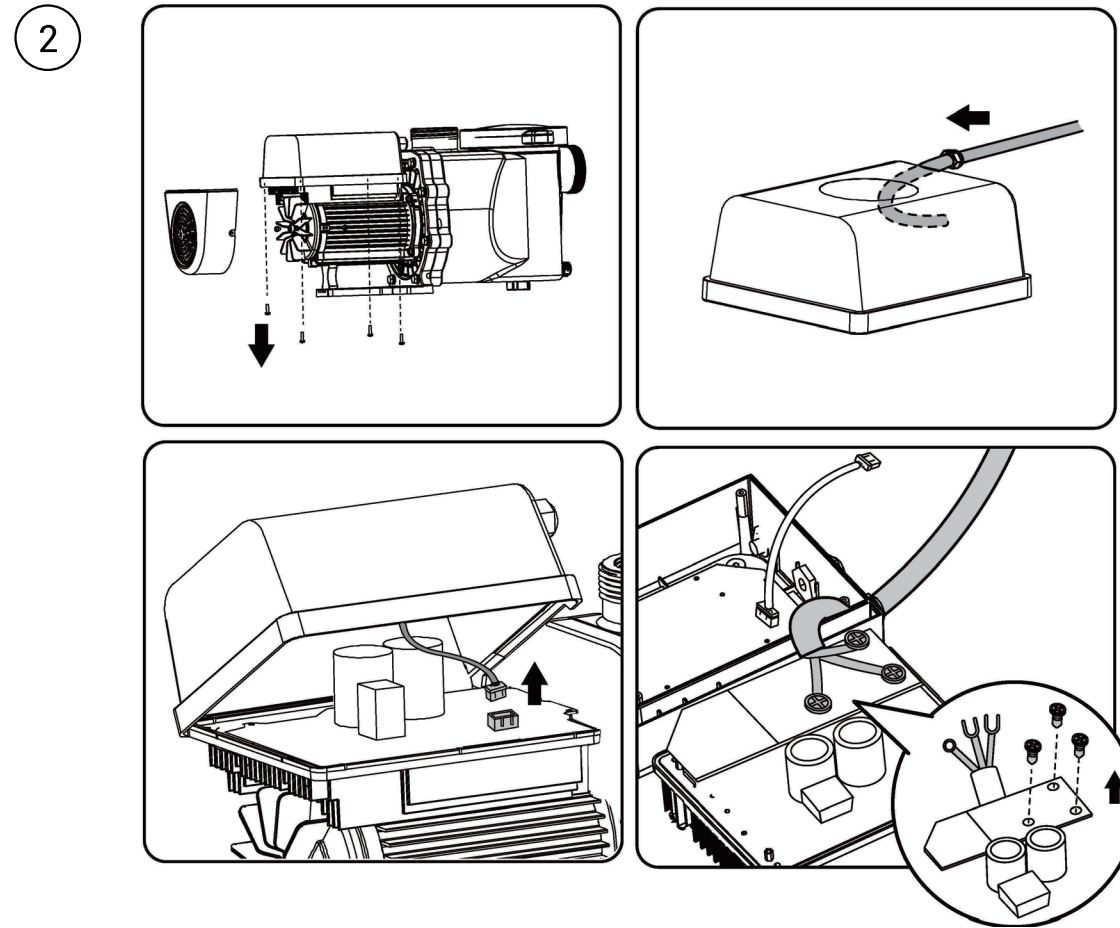
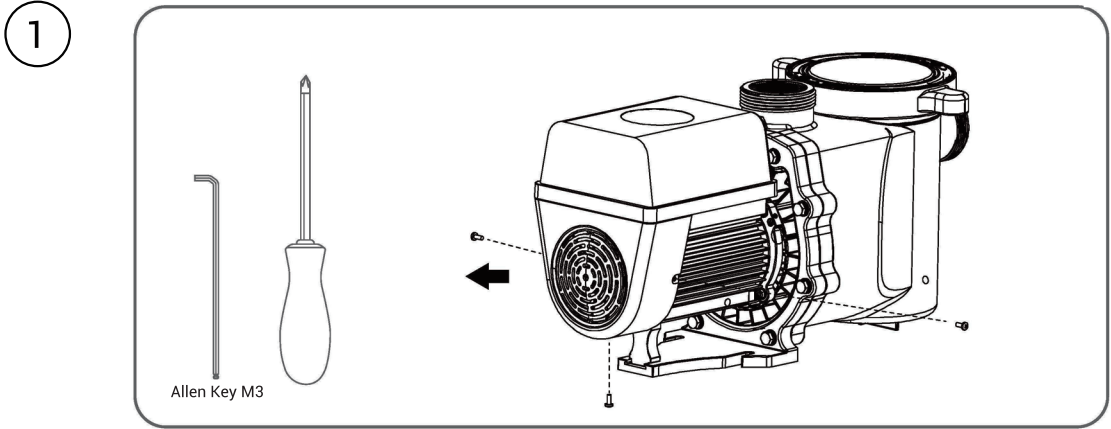
Color	Description	Setting Range	Default Setting
White	Digital Input 2	30~100%, by 5% increments	100%
Black	Digital Input 3	30~100%, by 5% increments	80%
Red	Digital Input 4	30~100%, by 5% increments	40%
Grey	Digital Input 1		Pump Stop
Yellow	Digital Ground		Ground
Green	RS485 A		
Brown	RS485 B		

a. Digital input

Running capacity is determined by the state of digital input,
 When digital input 1 is active the pump will be forced stop;
 When digital input 2 is active the pump will run at 100% (default);
 When digital input 3 is active the pump will run at 80% (default);
 When digital input 4 is active the pump will run at 40% (default);
 When no digital inputs are active. Pump display will return to last known state and manual control through on board controller settings.
 For example, pump is operating on timer function at 30% and digital input 2 is activated by external controller. Pump will run at 100% until digital input is disconnected and will return to timer operation at 30% and continue until timer is finished. If the pump timed operation is finished and is on off on standby mode, when the digital input 2 activates it will force run the pump at 100%. When digital input 2 is not active the pump will return to standby mode.
 Digital inputs can be identiied by the DI icon on the pump screen. The screen cannot be operated when a digital input is activated.

b.RS485

To connect with RS485-A and RS485-B, the pump could be controlled via Modbus 485 communicatlon protocol



9.1 High Temperature Warning and Speed Reduction

During normal operation (except backwash/self-priming), when the pump control system reaches the high temperature warning trigger threshold (178°F), it enters the high temperature warning state; when the temperature drops from the high temperature warning release threshold (7 72.4°F), the high temperature warning state is released. The display area alternately displays ALOI and running speed.

- 1) If ALOI displayed for the first time, the running capacity will be automatically reduced as below:

a. If current operating capacity is higher than 85%, the running capacity will be automatically reduced by 15%;
b. If current operating capacity is higher than 70%, the running capacity will be automatically reduced by 10%;
c. If current operating capacity is lower than 70%, the running capacity will be automatically reduced by 5%.
- 2) Suggestion for non-first displayed of ALOI: check the module temperature every 2 minutes. Compared with the temperature in the previous period, for every 1-degree Celsius increase, the speed will decrease by 5%.

9.2 Undervoltage protection

- 1)When pump is running under 230V:
When the device detects that the input voltage is less than 197V, the device will limit the current running speed.
When input voltage is less than or equal to 180V, the running capacity will be limited to 70%;
When the input voltage range is within 180V ~ 190V, the running capacity will be limited to 75%;
When the input voltage range is within 190V ~ 197V, the running capacity will be limited to 85%.
The display area alternately displays AL02 and running speed.
- 2) When pump is running under 115V:
When the device detects that the input voltage is less than 98V, the device will limit the current running speed.
When input voltage is less than 85V, pump will stop running automatically and display the Error code E00I;
When the input voltage range is within 85V ~ 90V, the running capacity will be limited to 75%;
When the input voltage range is within 90V ~ 98V, the running capacity will be limited to 85%.
The display area alternately displays AL02 and running speed

9.3 Troubleshooting

Problem	Possible causes and solution
Pump does not start.	<div><div>• Power Supply fault, disconnected or defective wiring.</div><div>• Fuses blown or thermal overload open.</div><div>• Check the rotation of the motor shaft for free movement and lack of obstruction.</div><div>• Because of long time lying idle. Unplug the power supply and manually rotate motor rear shaft a few times with a screwdriver.</div></div>
Pump does not prime.	<div><div>• Make sure the pump basket is filled with water and the O-ring of cover is clean.</div><div>• Loose connections on the suction side.</div><div>• Strainer basket or skimmer basket loaded with debris.</div><div>• Suction side clogged.</div><div>• Distance between pump inlet and liquid level is higher than 2m, height of pump installation should be lowered.</div></div>
Low Water Flow.	<div><div>• Pump does not prime.</div><div>• Air entering suction piping.</div><div>• Basket full of debris.</div><div>• Inadequate water level in pool.</div></div>
Pump being noisy	<div><div>• Air leak in suction piping, cavitation caused by restricted or undersized suction line or leak at any joint, low water level in pool, and restricted discharge return lines.</div><div>• Vibration caused by improper installation, etc.</div><div>• Damaged motor bearing or impeller (need to contact the supplier for repair).</div></div>

Empty the strainer basket frequently. The basket should be inspected through the transparent lid and emptied when there is an evident stack of rubbish inside. The following instructions should be followed:

- 1). Disconnected the power supply.
2). Unscrew the strainer basket lid anti-clockwise and remove.
3). Lift up the strainer basket.
4). Empty the trapped refuse from the basket, rinse out the debris if necessary.

Note: Do not knock the plastic basket on a hard surface as it will cause damage

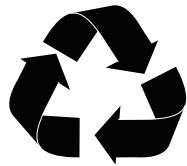
- 5). Inspect the basket for signs of damage, replace it.
5). Check the lid O-ring for stretching, tears, cracks or any other damage
7). Replace the lid, hand tightening is sufficient.

Note: Periodically inspect and clean the strainer basket will help prolong its life.

Observe all safety and warning information during installation and operation.

DISPOSAL CONSIDERATIONS

The transport and protective packaging has been selected from materials which are environmentally friendly for disposal, and can normally be recycled. Recycling the packaging reduces the use of raw materials in the manufacturing process and also reduces the amount of waste in landfill sites. Ensure that any plastic wrappings, bags etc. are disposed of safely and kept out of the reach of babies and young children. Danger of suffocation.



DISPOSING OF YOUR ELECTRICAL PRODUCT

Electrical devices marked with this label may not be disposed of in domestic waste at the end of their service life.

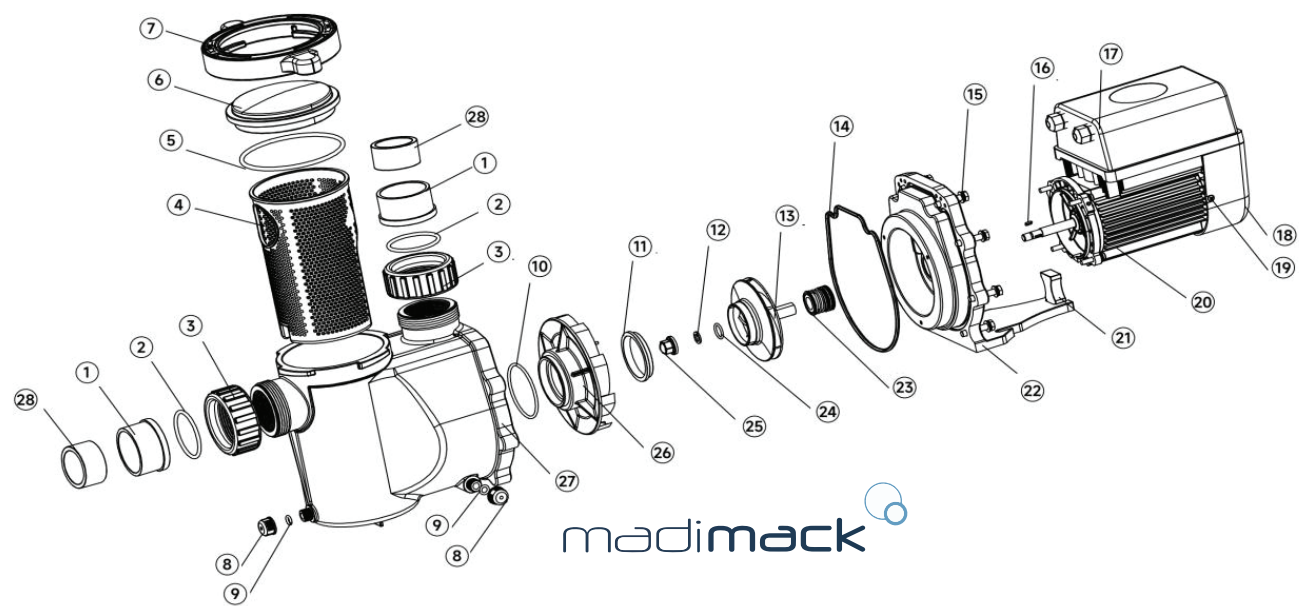
Electrical and electronic appliances often contain valuable materials. They also contain specific materials, compounds and components, which were essential for their correct function and safety. These could be hazardous to human health and to the environment if disposed of with your domestic waste or if handled incorrectly. Please do not, therefore, dispose of your old appliance with your household waste.

Please dispose of those materials by contacting your local authorities and ask for the correct method of disposal. Please ensure that your old appliance poses no risk to children while being stored prior to disposal. By disposing of this product in accordance with the regulations, you protect the environment and the health of -those around you from negative consequences.



12 | DIAGRAM

12.1 Exploded view



Explosive Diagram Code	Part Name	Quantity	Explosive Diagram Code	Part Name	Quantity
1	T union	2	16	Parallel key	1
2	O-ring (2 7/16×11/64 inch)	2	17	Inverter controller	1
3	Union nut	2	18	Fan cover	1
4	Strainer basket	1	19	Cross recess head screw	3
5	O-ring (for Transparent Lid) (5 3/64×13/64 inch)	1	20	Motor	1
6	Transparent Lid	1	21	Base	1
7	Nut for lid	1	22	Sealplate	1
8	Drain plug	2	23	Mechanical seal	1
9	O-ring (25/64×1/8 inch)	2	24	O-ring (43/64×7/64 inch)	1
10	O-ring (2 7/8×9/64 inch)	1	25	Nut for impeller	1
11	Turnable ring	1	26	Diffuser	1
12	Spring washer	1	27	Pump body	1
13	Impeller	1	28	Reducing Bushing	2
14	Pump body gasket	1			
15	Stainless-Steel hex head bolt	8			