

inverFLOW^M



Installation Manual

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THANK YOU FOR PURCHASING OUR INVERTER POOL PUMPS.

THIS MANUAL CONTAINS IMPORTANT INFORMATION THAT WILL HELP YOU IN OPERATING AND MAINTAINING THIS PRODUCT.

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

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.

POMPE À EXTRÉMITÉ IMMERGÉE ISOLÉE.

UTILISEZ UNIQUEMENT DES CONDUCTEURS EN CUIVRE.

POUR UNE UTILISATION AVEC LES PISCINES, LES BAINS À REMOUS ET LES SPAS.

ATTENTION: BRANCHER SEULEMENT À UNE PRISE DE COURANT AVEC MISE À LA TERRE PROTÉGÉE PAR UN DISJONCTEUR DIFFÉRENTIEL DE CLASSE A.

ATTENTION: À FIN D'ASSURER UNE PROTECTION PERMANENTE CONTRE LE DANGER DE CHOC

ÉLECTRIQUE, LORS DE L'ENTRETIEN EMPLOYER SEULEMENT DES PIÈCES DE RECHANGE IDENTIQUES.

ATTENTION: CETTE POMPE EST DESTINÉE À ÊTRE UTILISÉE UNIQUEMENT AVEC DES PISCINES INSTALLÉES EN PERMANENCE – NE PAS UTILISER AVEC DES PISCINES STOCKABLES.

1. IMPORTANT SAFETY INSTRUCTIONS

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

- 1) READ AND FOLLOW ALL INSTRUCTIONS.
- 2) Installation shall comply with the applicable requirements of the current National Electrical Code® (NEC®) or Canadian Electrical Code (CEC), as appropriate.
- 3) WARNING – To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
- 4) 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.
- 5) 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.
- 6) WARNING – To reduce the risk of electric shock, replace the damaged cord immediately.
- 7) 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.
- 8) Do not install within an outer enclosure or beneath the skirt of a hot tub or spa.
- 9) A solid copper bonding conductor not smaller than 8 AWG (8.4 mm²) 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 (1.5 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.

- 10) For Use with Swimming Pools, Hot Tubs, and Spas.
- 11) CAUTION: This Pump is for Use with Permanently-Installed Pools Only – Do Not Use with Storable Pools.
- 12) CAUTION: To reduce the risk of electric shock, install at least 6 feet from the inside walls of a pool. Do not use an extension cord.
- 13) CAUTION: To ensure continued protection against shock hazard, use only identical replacement parts when servicing.
- 14) 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.
- 15) The pump is not submersible.
- 16) The inverter controller of the pump incorporates a magnetic line starter with overload relays, and includes thermal overload electronic protection.
- 17) Never open the inside of the drive motor enclosure.
- 18) ENCLOSURE TYPE 3.
- 19) FOR USE WITH SWIMMING POOLS ONLY.
- 20) 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.

2. TECHNICAL SPECIFICATIONS

Model	THP	Voltage (V)	Frequency (Hz)	Current (A)	Qmax (US gpm)	Hmax (Ft)
M100	0.85	115	60	7.0	97	54
		230		3.5	97	
M150	1.25	115		8.3	110	59
		230		4.6	112	
M200	1.65	115		9.6	123	67
		230		6.5	136	

3. OVERALL DIMENSIONS

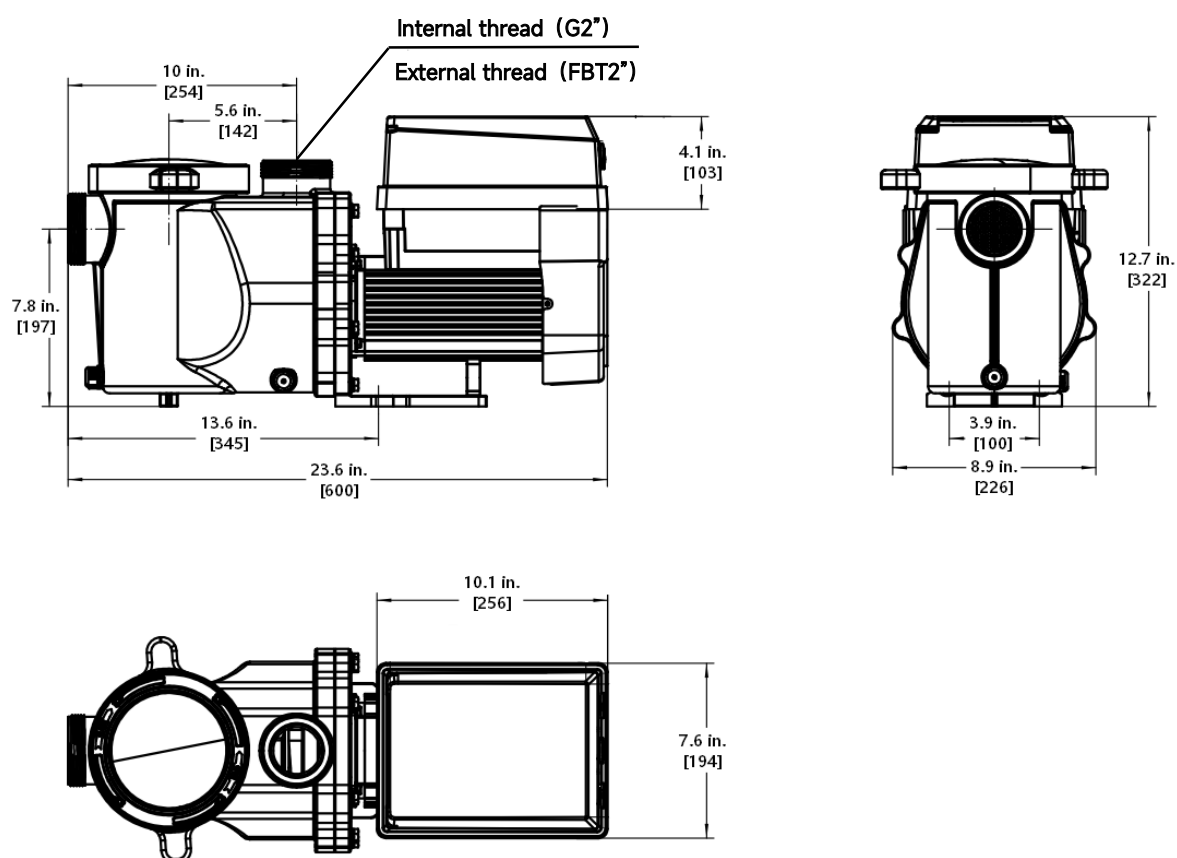


Figure 1 - Pump Dimensions

4. INSTALLATION

4.1. Pump Location

- 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) DO NOT install the pump in a damp or non-ventilated location. Keep pump and motor at least 5.9 inch (150mm) away from obstacles, pump motors require free circulation of air for cooling.
- 3) The pump should be installed horizontally and fixed in the hole on the support with screws to prevent unnecessary noise and vibration.

4.2. Plumbing and Valves

- 1) The pump inlet/outlet union size: optional with metric (48.3 or 60.3mm) or imperial (1.5" or 2").
- 2) For optimization of the pool plumbing, a larger pipe size should be used. It is recommended to use a pipe with size of 2".
- 3) When installing the inlet and outlet fittings (joints) with the plumbing, use the special sealant for PVC material.
- 4) 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 pump's efficiency.
- 5) To reduce friction loss and improve efficiency, plumbing on the suction and return side should be short and direct.
- 6) Flooded suction systems should have valves installed in both the pump suction and return line, which is convenient for routine maintenance. A valve, elbow, or tee installed on the suction line should be no closer to the front of the pump than five times the suction line diameter.
- 7) Use a check valve in the return line where there is a significant height between the return line and the outlet of the pump, to prevent the pump from the impact of medium recirculation and pump-stopping water hammer.

4.3. Fittings

- 1) Elbows should be no closer than 5 times suction pipe diameter to the inlet. Do not install 90° elbows directly into the pump inlet/outlet.
- 2) Joints must be tight.

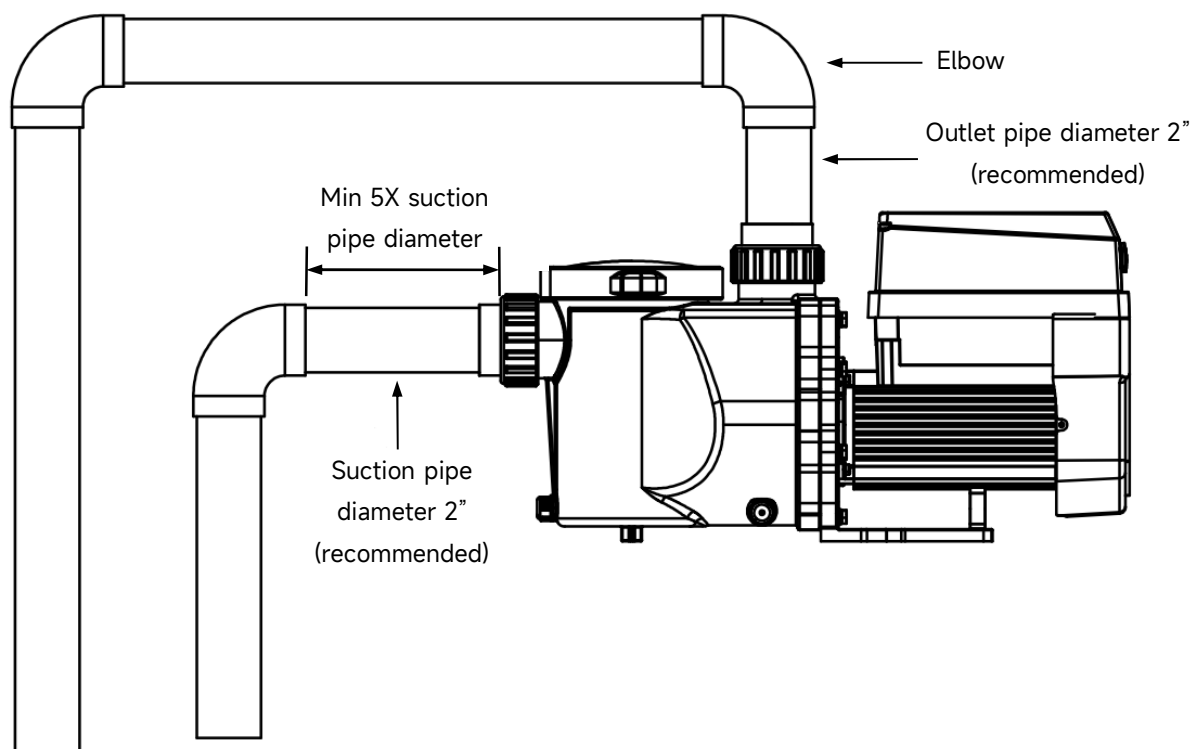


Figure 2 - Plumbing and Fittings installations

* The pump inlet/outlet union size: optional with metric (48.3 or 60.3mm) or imperial (1.5" or 2")

- 3) Use the UNION KIT supplied by the pump manufacturer (Refer to Figure 3). Do not use other fittings to connect the pump inlet/outlet, in case the fittings are not match and damage the pump body.

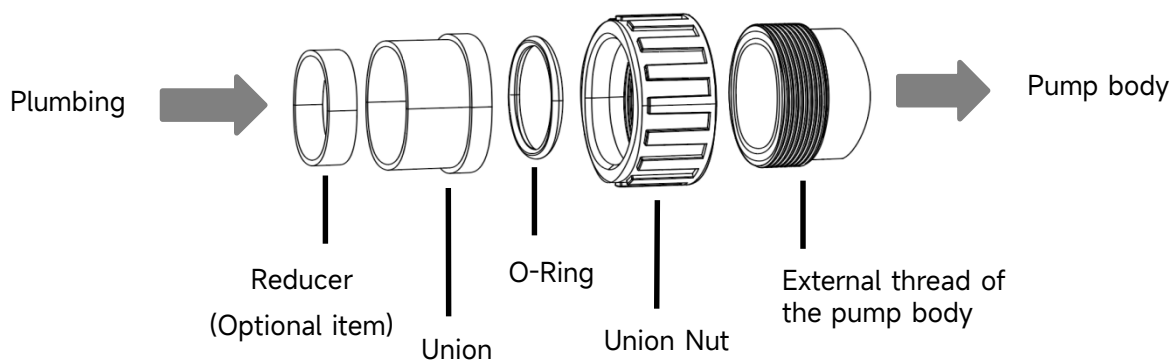


Figure 3 - Union Kit

4.4. 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.

4.5. Application Conditions

Ambient temperature	Indoor installation, temperature range: 14°F~107.6°F (-10~42°C)
Maximum water temperature	122°F (50°C)
Salt water	Salt concentration up to 3.5%, i.e 35g/l (35000 ppm)
Humidity	≤90% RH, 68°F±35.6°F (20°C±2°C)
Installation	The pump can be installed max. 6.56ft above water level
Protection	Class F, IP55

4.6. Electrical Installation



WARNING: RISK OF ELECTRICAL SHOCK OR ELECTROCUTION.

This pump must be installed by a licensed or certified electrician or a qualified service professional in accordance with the National Electrical Code, or in Canada the Canadian Electrical Code (CEC), and all applicable local codes and ordinances. Improper installation will create an electrical hazard which could result in death or serious injury to users, installers, or others due to electrical shock, and may also cause damage to property.

● Electrical Specifications

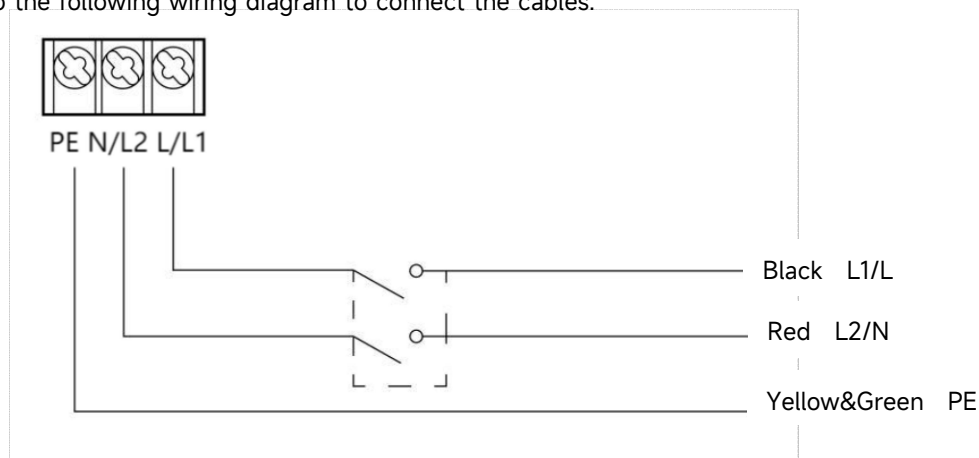
Model	THP	Voltage (V)	Frequency (Hz)	Current (A)
M100	0.85	115	60	7.0
		230		3.5
M150	1.25	115		8.3
		230		4.6
M200	1.65	115		9.6
		230		6.5

- **Voltage**

Voltage at pump MUST NOT be more than 10% above or below nameplate rated voltage, or components may overheat, causing overload tripping and reduced component life.

- **Wiring**

- 1) Ensure all appropriate electrical breakers and switches are turned off before wiring the motor.
- 2) Ensure the supply voltage meets the requirements listed on the motor nameplate. If these requirements are not met, permanent motor damage may occur.
- 3) The pump should be permanently connected to its own independent GFCI-protected circuit. No other equipment, lights, appliances, or outlets may be connected to the pump circuit.
- 4) Refer to the following wiring diagram to connect the cables.



Note: The gauge for the power cord is suggested to be no less than 14 AWG.

Figure 4 - Power cord connection

- **Grounding**

Ensure the ground wire is connected to an electrical service ground.

- **Bonding**

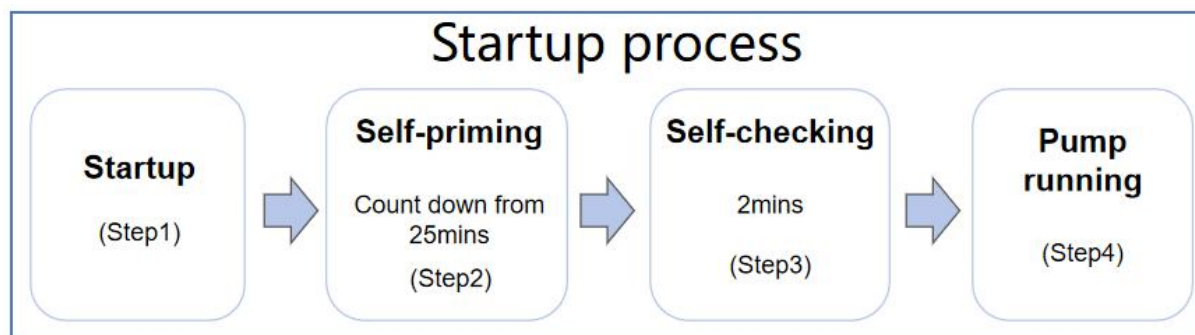
- 1) In addition to being properly grounded as described in the Electrical Wiring section, and in accordance with the requirements of the National Electrical Code (NEC), or in Canada the Canadian Electrical Code (CEC), the pump motor must be bonded to all metal parts of the swimming pool, spa or hot tub structure and to all electrical components and equipment associated with the pool/spa water circulation system.
 - 2) The bonding must be accomplished by using a solid copper conductor, No.8 AWG or larger. In Canada No. 6 AWG or larger must be used. Bond the motor using the external bonding lug provided on the motor frame.
- Connect the wire to all metal parts of the pool, electrical equipment, metal conduit, and metal piping within 5 ft. (1.5 m) of the inside walls of the pool.

5. SETTING AND OPERATION

5.1. Display on Control Panel

① Running capacity / power display	② Running capacity / power indicator
③ Time indicator	④ Anti-freeze protection indicator
⑤ WIFI indicator	⑥ Timer indicator 1/2/3/4
⑦ Skimmer function indicator	⑧ Digital input function indicator
⑨ RS485 function indicator	
Backwash setting	Up / Down: to change the value of setting
Timer setting / power reading	Parameter setting
On/Off	Unlock

5.2. Startup Process Overview



① Step 1: Startup

- Press and hold  for more than 3 seconds to unlock the screen.
- Press  to startup the pump.

② Step 2: Self-priming

- The pump will start counting down from 25mins; When the system detects the pump is full of water, it will stop counting down and exit priming automatically.
- Users can enter the parameter setting to disable the default self-priming function. (see 5.10, parameter No.6)

③ Step 3: Self-checking

- The pump will recheck for 2mins again to make sure the self-priming (Step2) is completed.

④ Step 4: Pump running

- The pump will run at 80% of the running capacity at the initial startup after the self-priming.

5.3. 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  will light up; Press and hold  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  to wake up the screen and observe the relevant operating parameters.

5.4. 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 25 mins and stop count down automatically when the system detects the pump is full of water, then the system will recheck for 2 mins again to make sure the self-priming is completed.

Users can cancel self-priming manually by pressing  for more than 3 seconds. The pump will run at the default 80% speed at the initial startup.

Remark:

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. (see 5.10, parameter No.6)

5.5. Backwash

Users can start the backwash or fast re-circulation in any running state by pressing . It can also be activated the backwash when the pump in OFF mode.

	Default	Setting range
Running Time	1h	Press  or  to adjust from 0-24h with 15 mins for each step
Running capacity	100%	80-100%, enter the parameter setting (see 5.10, parameter No.4)

Exit backwash:

When backwash mode is on, users can hold  for 3 seconds to cancel it, the pump will return to the previous state before backwash. If a speed limit is set by the users, the running capacity of the backwash will not exceed the set speed limit. (see 5.9)

5.6. 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%.
4		Hold  for more than 3 seconds to read the real-time power. It will return to the running capacity display after 10s without operation.

Note: When the running capacity is adjusted, the system will save the latest parameter automatically.

5.7. Timer Mode

The pump's on/off and running capacity could be commanded by a timer, which could be programmed daily as needed.

1	Enter timer setting by pressing 	
2	Press  or  to set the local time. Press  to confirm and move to timer-1 setting.	
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 5 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 5 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.	

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 (1 or 2 or 3 or 4) will stay on, and the set running capacity will be shown on the screen.
- 2) When timer mode is activated, if the set time period does not contain the current time, the timer indicator (1 or 2 or 3 or 4) that is about to start running will light up and flash, and the current time will be displayed on the screen.
- 3) During the timer setting, if users want to return to the previous setting items, hold both   for 3 seconds.
- 4) If users don't need 4 timers, 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) Users can hold  for 3 seconds to read the real-time power and it will return to the timer display after 10s without operation.
- 6) The timer setting of the pump have been limited, users will not set the overlapping timers.
- 7) After the timer is set and then users turn off the pump, when users turn on the pump again, it will continue to return to the timer mode.
- 8) When timer mode is activated, users can press  or  to adjust the running capacity for temporary running in the current time schedule.
- 9) Users can set the pump to repeat the time schedule weekly or not. After time period and running capacity setting of timer 1~4 completes, the screen displays **Sync-1**, in this case:
 - a: Press the button  can switch the setting between **Sync-0** and **Sync-1**.
 - b: **Sync-0** means disable to repeat the time schedule weekly; **Sync-1** means enable to repeat the time schedule weekly;
 - c: Once the pump completes App pairing, it will automatically switch to **Sync-1**, the timer setting of the pump will be in accordance with the setting on the APP;
- 10) Users can cancel the timer mode by holding  for 3 seconds.

5.8. 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. When first switching to this mode, the indicator of skimmer mode  will flash.

Users can press  or  to select the skimmer mode among the four presets, the details of each preset are as below (Table 1), the selected preset will be activated after 5s without operation.

When the pump is in preset 1/2/3, the  indicator will light up.

When skimmer mode is activated, the pump will alternately display skimmer speed、skimmer cycle and skimmer duration in sequence every 10 seconds.

Preset	Skimmer cycle	Skimmer duration	Skimmer speed	Time period	Remark
1	1h	3mins	100%	07:00AM – 09:00PM	Editable in parameter setting
2	1h	10mins	100%	07:00AM – 09:00PM	No editable
3	3h	3mins	80%	07:00AM – 09:00PM	No editable
4	Turn off the skimmer mode				No editable

Table 1 - Presets of skimmer mode

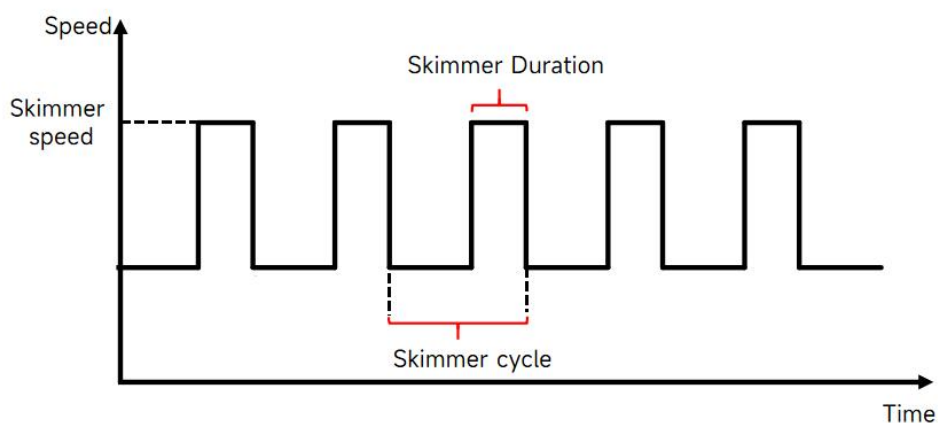


Figure 5 - Skimmer cycle

5.9. Speed Limit

Users can set the speed limit of the pump to meet the flow requirement of other equipment such as sand filters.

Speed limit of the pump can be set in the parameter setting. (see 5.10, parameter No.11)

100% means no speed limit and the running capacity can be set from 30% - 100% under normal operation.

Model	Speed limit
	Maximum Running Speed
M100	60%~100%
M150	60%~100%
M200	60%~100%

To ensure the performance, the self-priming process at each start will not be limited by the speed limit function.

5.10. Parameter Setting

Restore factory setting	Switch off the pump, then hold both   for 3 seconds
Check the software version	Switch off the pump, then hold both   for 3 seconds
Enter parameter setting as below	Switch off the pump, press  to parameter setting; Press  to select the parameter address and press  or  to adjust the parameter setting.

Parameter Address	Description	Default Setting	Setting Range
1	Di2 (Digital input 2)	100%	30-100%, by 5% increments
2	Di3 (Digital input 3)	80%	
3	Di4 (Digital input 4)	40%	
4	Backwash	100%	80-100%, by 5% increments

5	Control mode of Analog Input	0	0: Current control 1: Voltage control
6	Enable or disable the self-priming at each start	25	25: enables 0: disables
7	self-priming recheck time	2	1-15 mins, by 1 min for each step
8	System time	12:00 AM	Hour: 12:00AM-11:00PM, by 1 hour for each step; Minute: 0-59 minutes, by 1 minute for each step;
9	Preset 1 of the skimmer mode	Skimmer cycle : 01:00 Skimmer duration : 00:03 Skimmer speed : 100%	*Skimmer cycle: 1-24h, by 1h for each step; *Skimmer duration: 1-30mins, 1min for each step; *Skimmer speed: 30%-100%, by 5% increments;
10	Time period of the preset 1 of the skimmer mode	07:00 AM - 09:00 PM	Hour: 12:00AM-11:00PM, by 1 hour for each step; Minute: 0-59 minutes, by 1 minute for each step;
11	Speed limit	100%	60%-100%, by 5% increments (100% means no speed limit)
12	RS485 for controller	0	0: Madimack Protocol 1: P type control system 2: H type control system 3: J type control system
	RS485 address for controller	170(0xAA)	Madimack: 160~191 P type: 01~16 H type: -- J type: 01~16
13	Freeze protection	1) 0 2) F 3) 37 4) 30%	1) 0: disables 1: enables 2) Unit: F: Fahrenheit C: Celsius 3) Temperature: 34~50°F, by 1°F increments 1~10°C, by 1°C increments 4) Running speed: 30~50%, by 5% increments

14	Reserved	0	Not editable
15	Relay 16A	1) 0 2) 12:00AM 3) 12:00AM	1) 0: Relay timer ON 1: Relay timer OFF 2) Start time of relay timer: Hour: 12:00AM-11:00PM, by 1 hour for each step; Minute: 0-59 minutes, by 1 minute for each step; 3) End time of relay timer: Hour: 12:00AM-11:00PM, by 1 hour for each step; Minute: 0-59 minutes, by 1 minute for each step;

For example: How to Enable / Disable Self-Priming Function?

- 1) **Enter parameter setting:** Switch off the pump, then hold both   for 3 seconds;
- 2) **Select parameter address:** Press  to select address 6;
- 3) **Enable or disable the self-priming function:** Adjust by pressing  or , 25= Enables, 0=Disables.

6. WIFI OPERATION

① Download iGarden APP



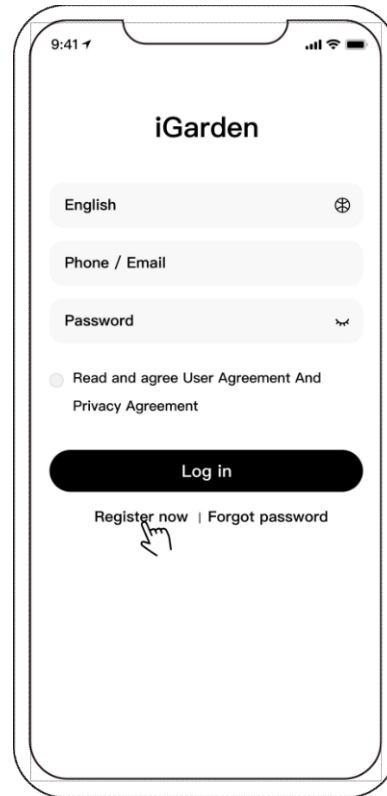
Android



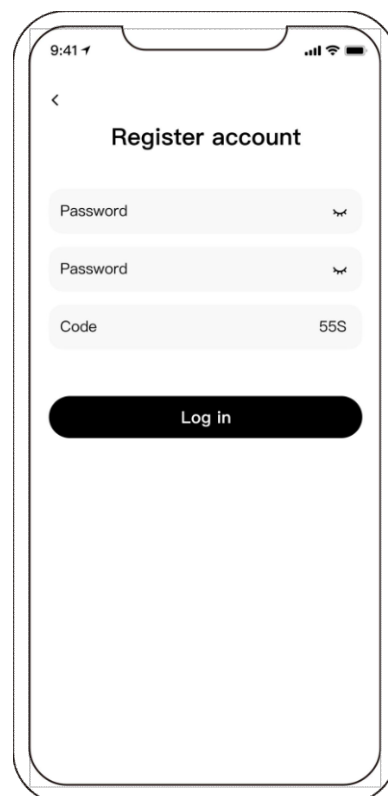
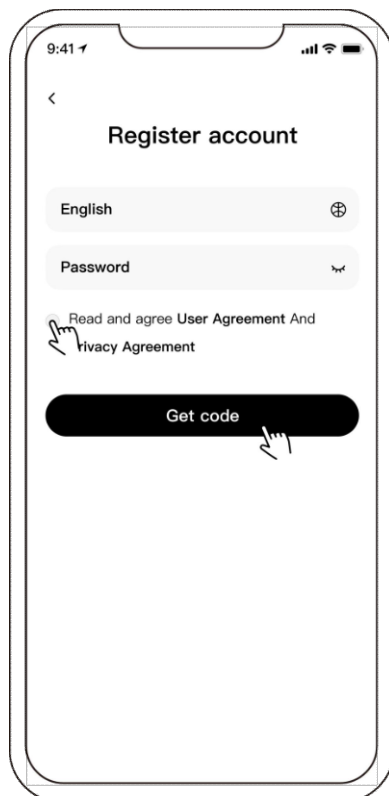
iOS



② Account Registration



Phone / Email Registration



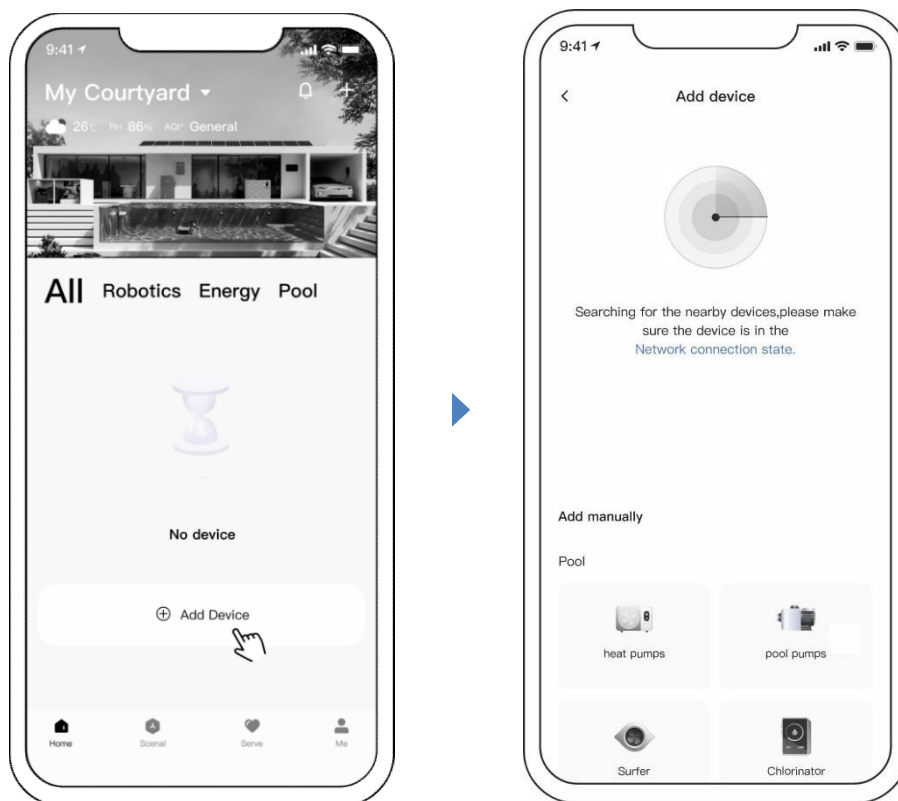
3 App Pairing

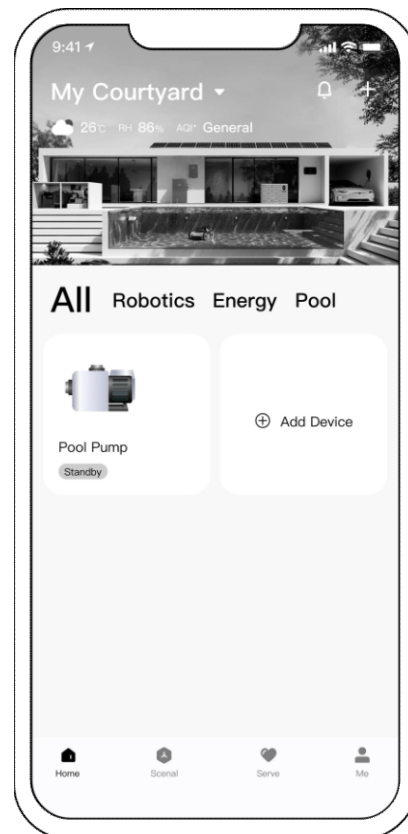
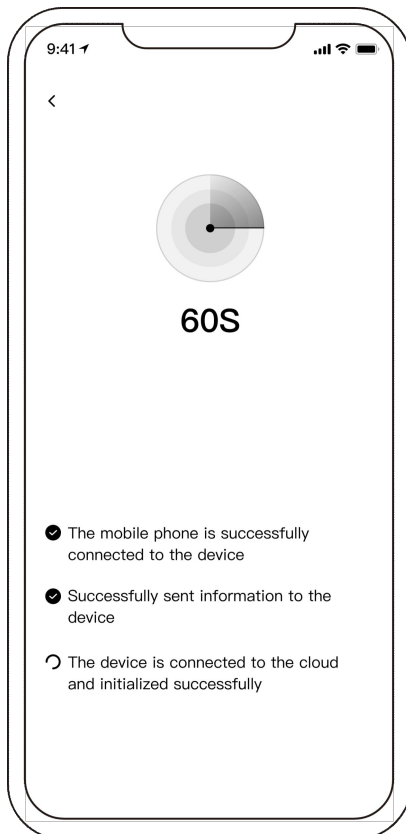
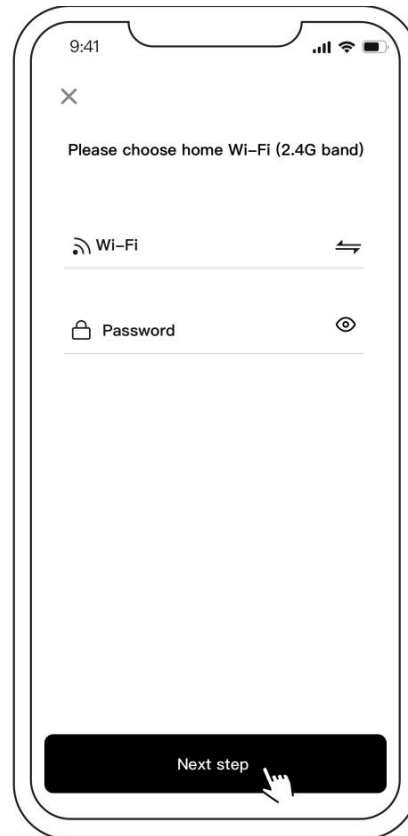
Please make sure your pump is turned on before you start.

Option 1 - Automatic pairing (Recommended):

Network requirement: 2.4GHz.

- 1) Please confirm that your phone is connected to Wifi and the Bluetooth of your phone is ON.
- 2) Press  for 3 seconds to unlock the screen. After switching on the pump, press  for 5 seconds until hearing “Beep” and then release.  will flash.
- 3) Click “Add Device”, and wait for a few seconds to search the nearby device.
- 4) Click on the pool pump icon and follow the instructions to pair device.

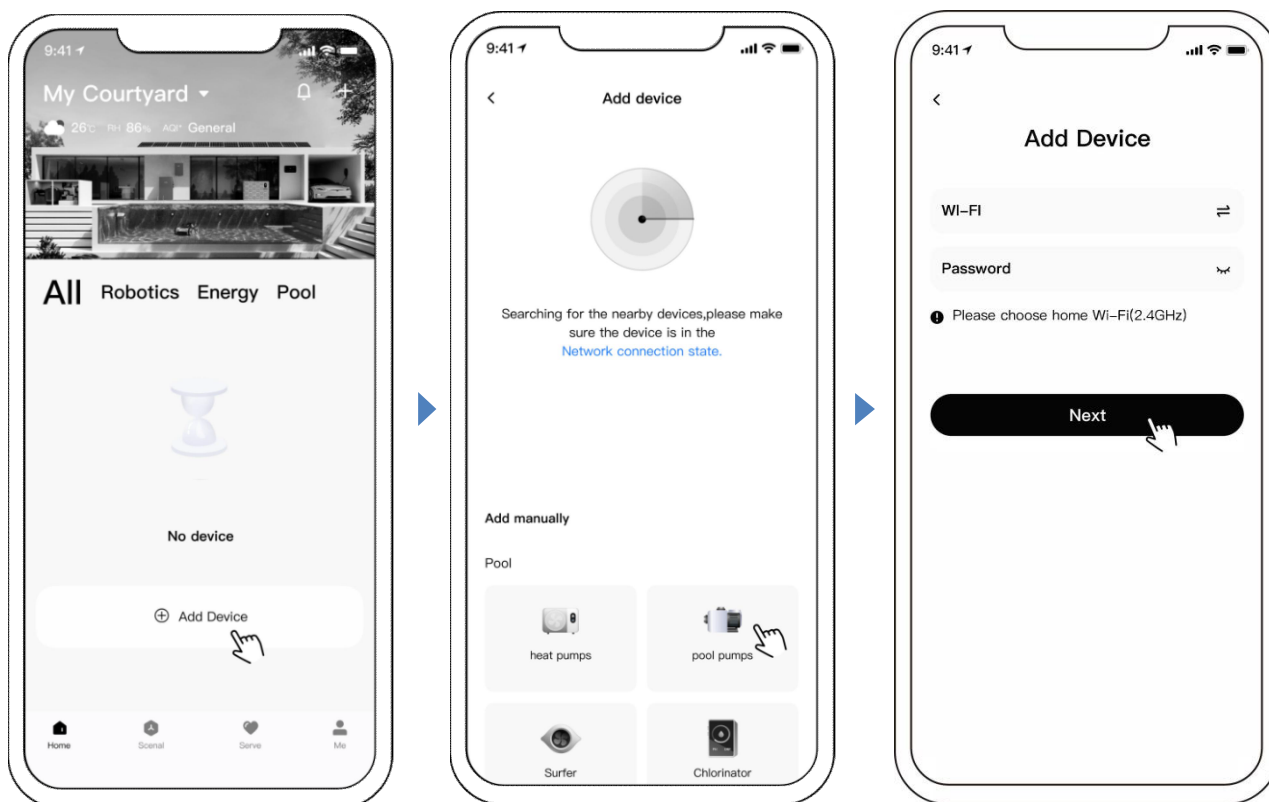


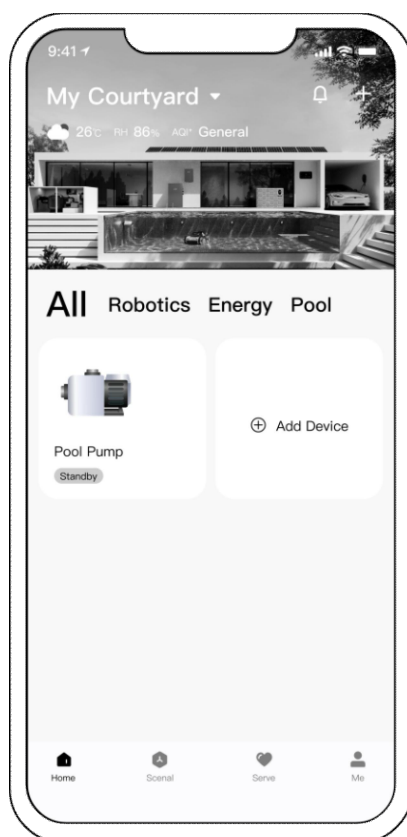
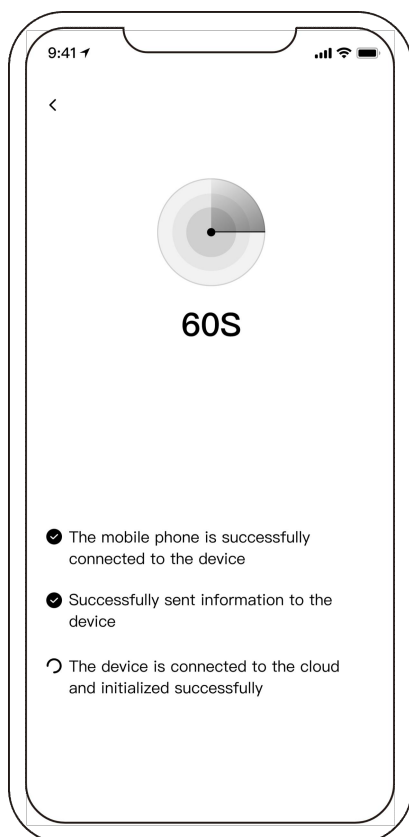
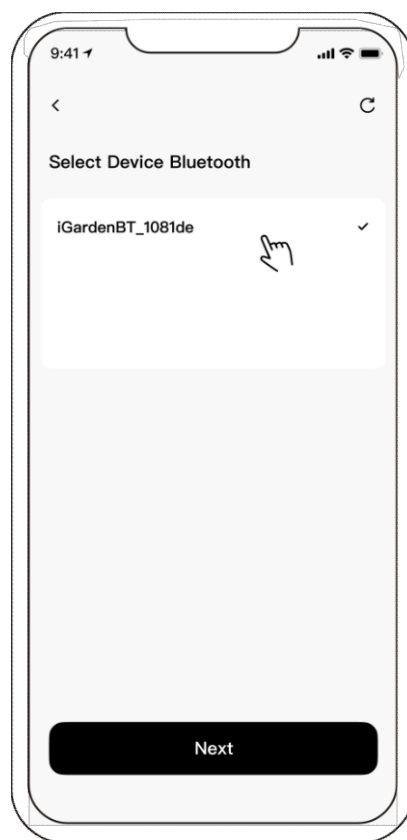


Option 2 - Bluetooth pairing :

Network requirement: 2.4GHz.

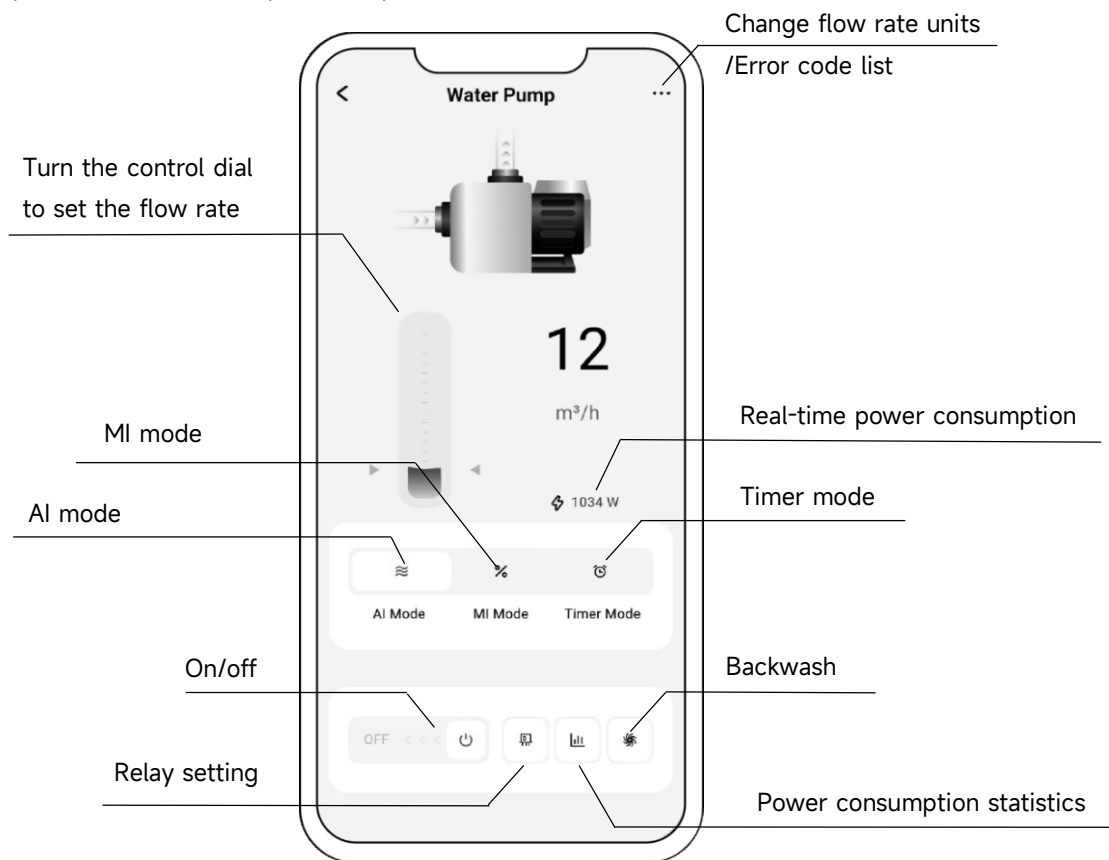
- 1) Please confirm that your phone is connected to Wifi and the Bluetooth of your phone is ON.
- 2) Press  for 3 seconds to unlock the screen. After switching on the pump, press  for 5 seconds until hearing “Beep” and then release.  will flash.
- 3) Click “Add Device”, and follow the instructions to pair device.



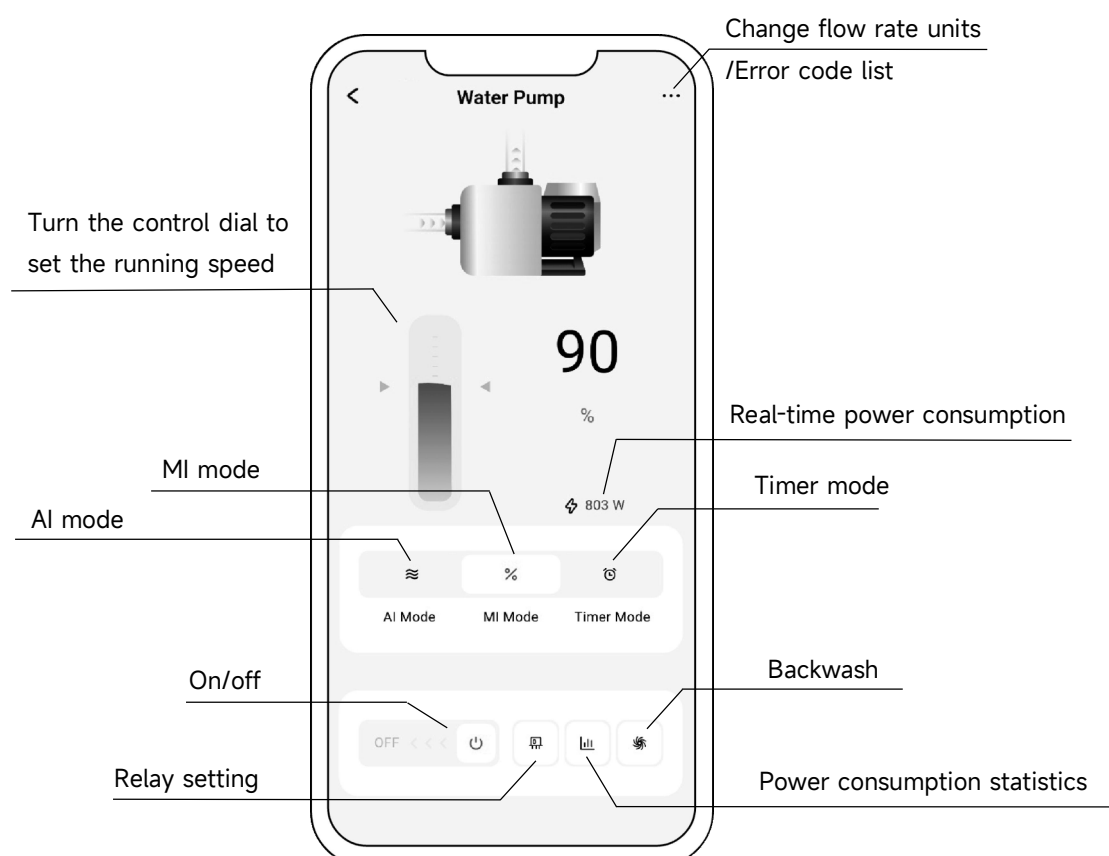


4 Operation

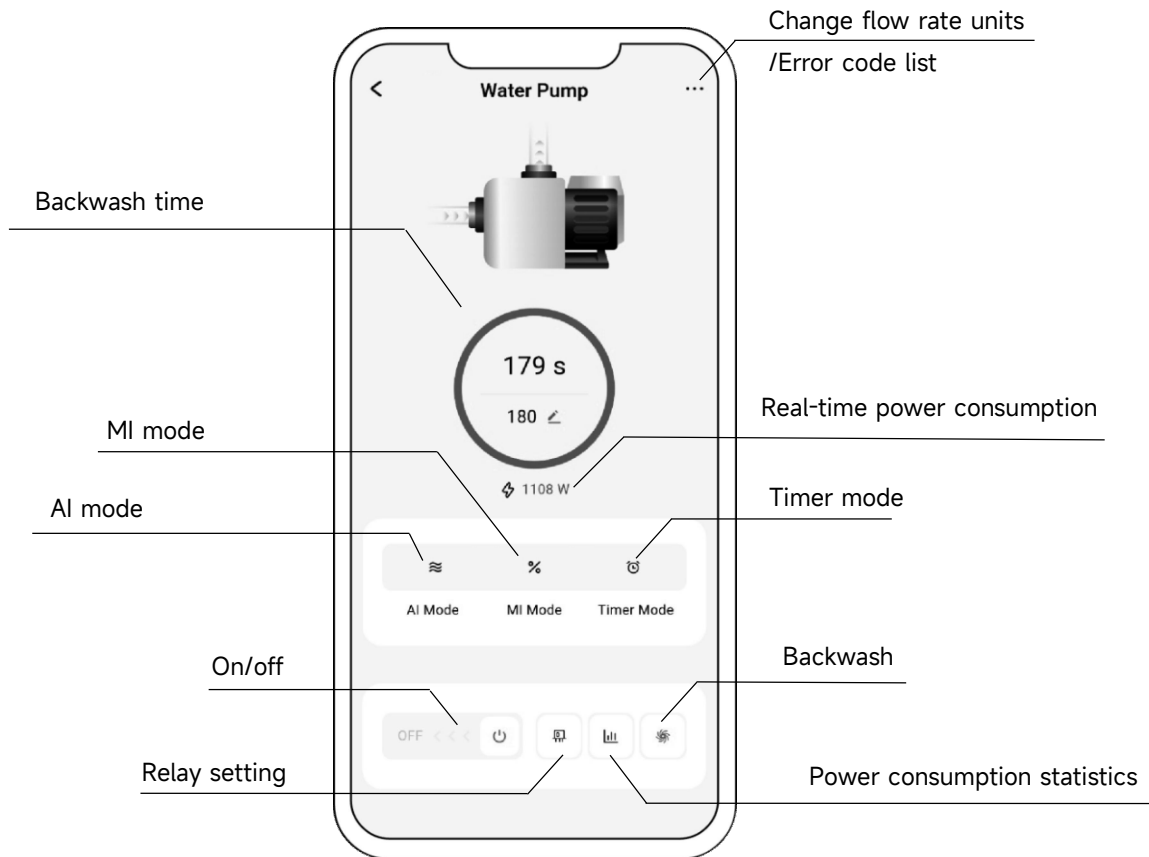
1) Auto Inverter mode (AI mode) :



2) Manual Inverter mode (MI mode) :

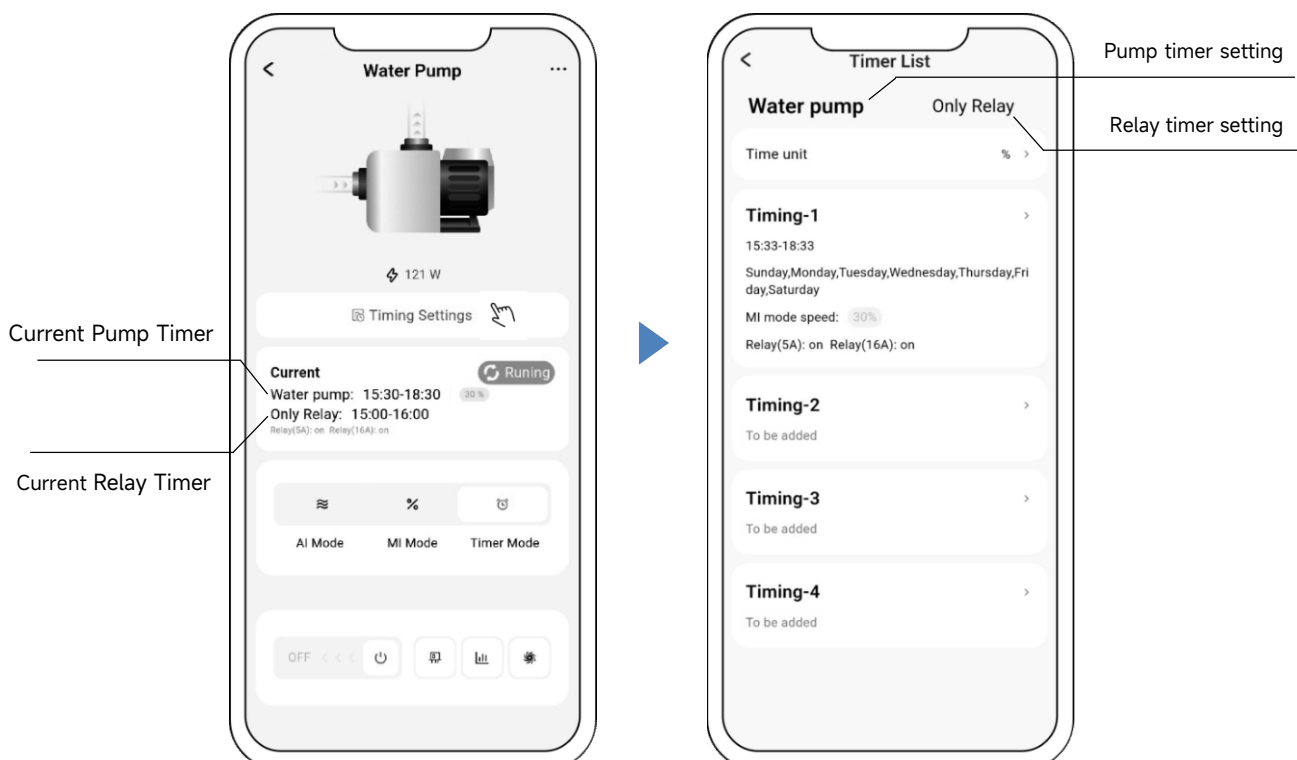


3) Backwash :



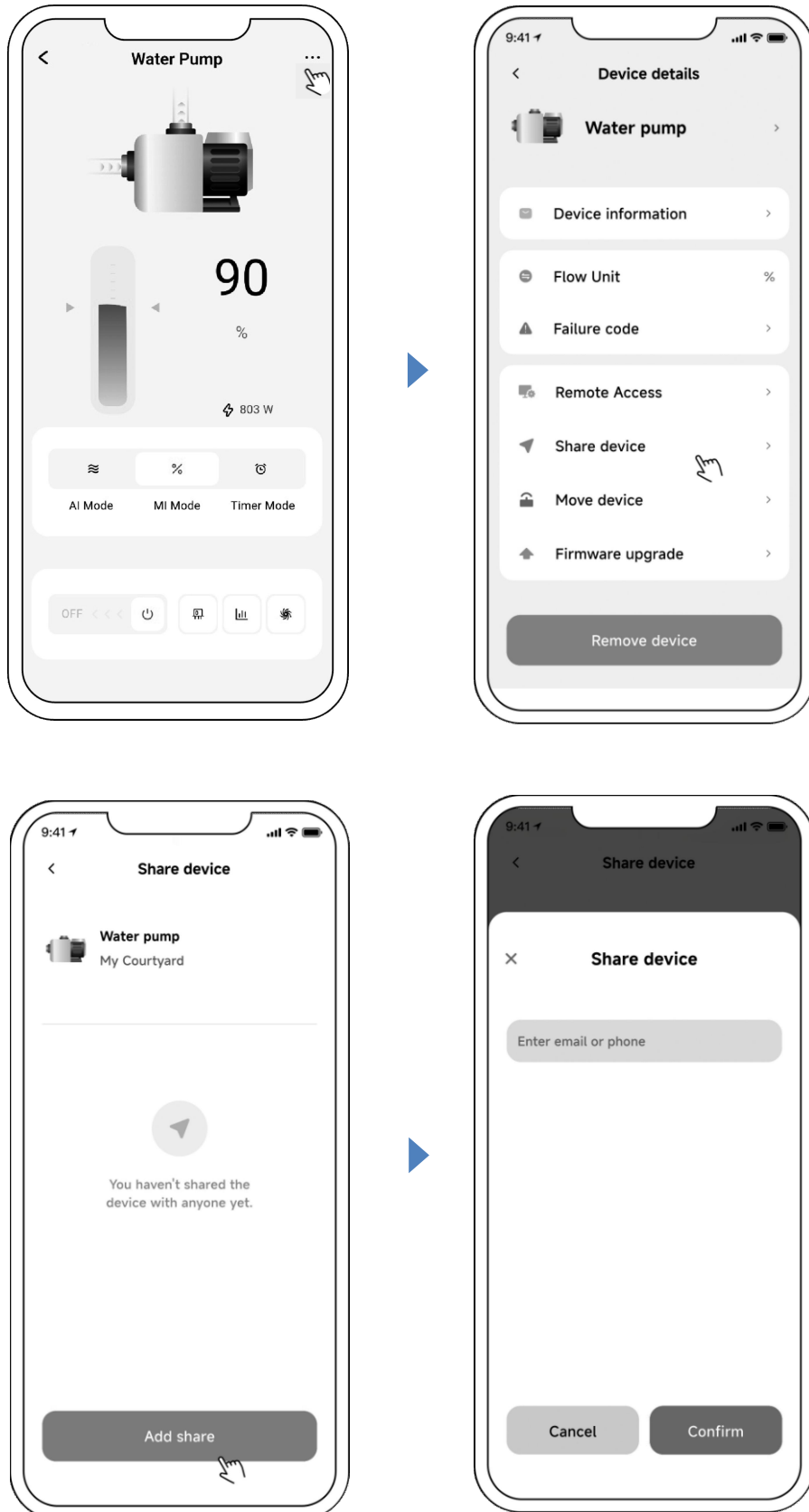
Notice for the timer setting via the APP :

- 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;



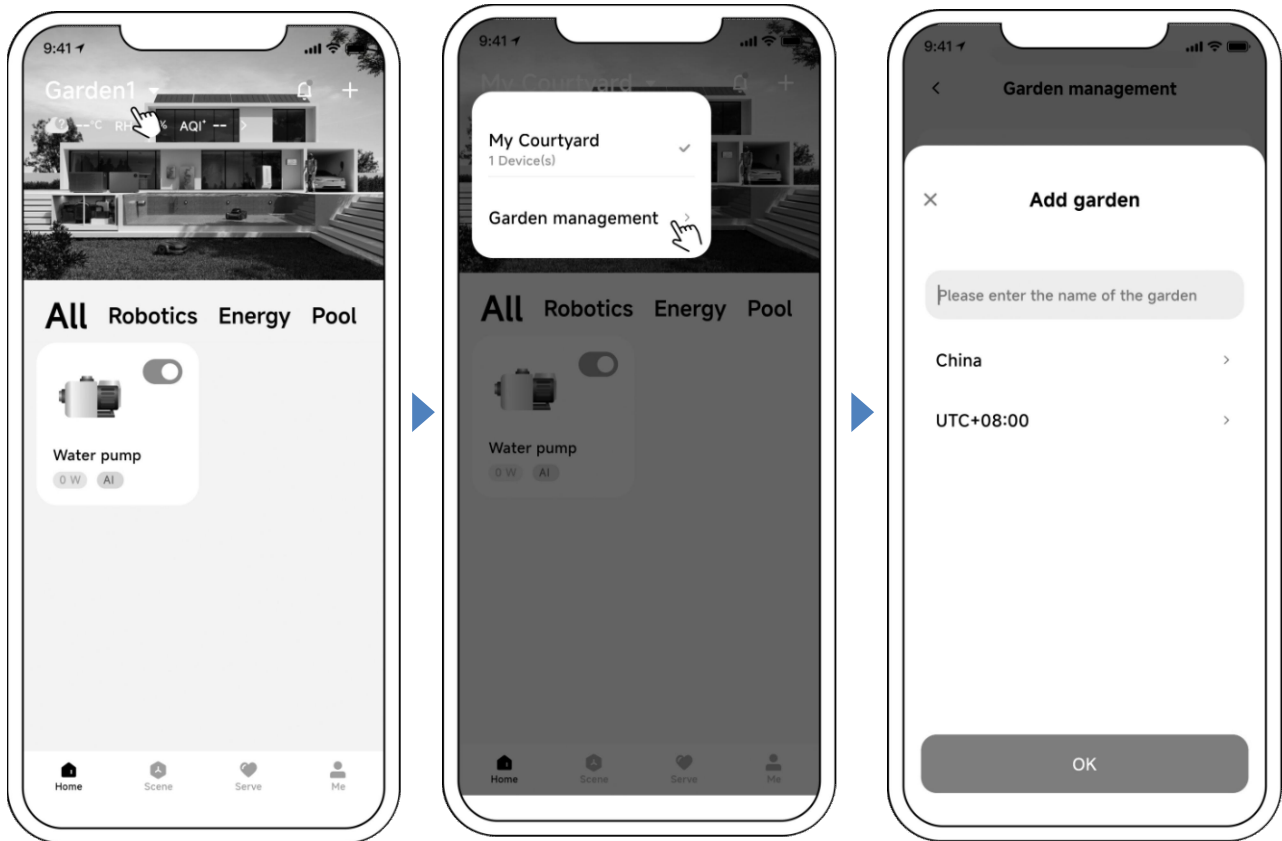
5 Sharing Devices with your family members

Users can share the devices to be controlled by their family members. Please let your family members register “MOOV POOL Ai” first, and then the administrator can operate as below:



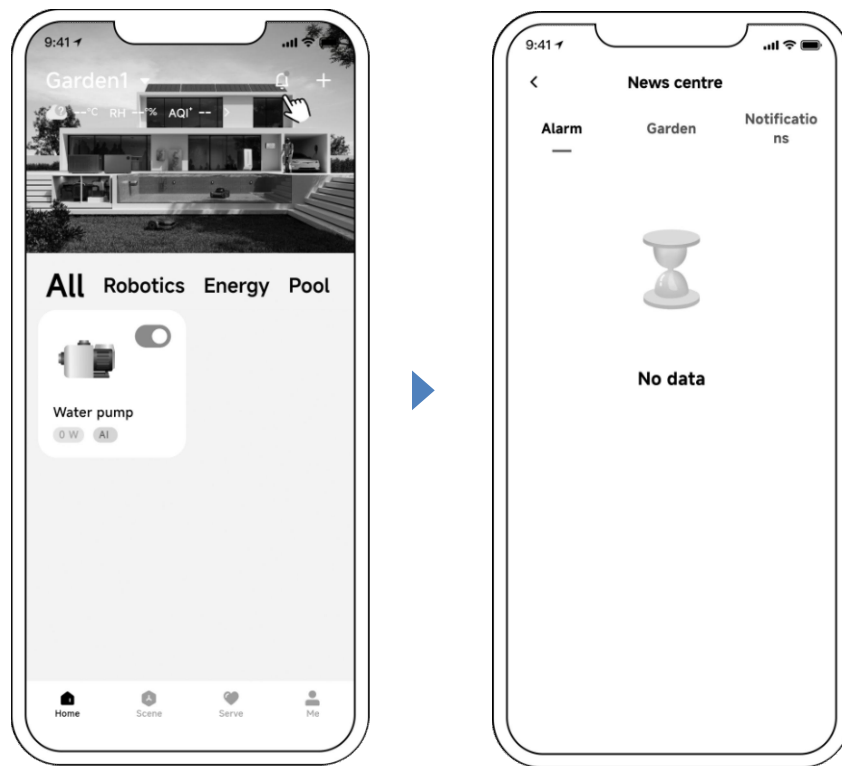
6 Garden Management

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

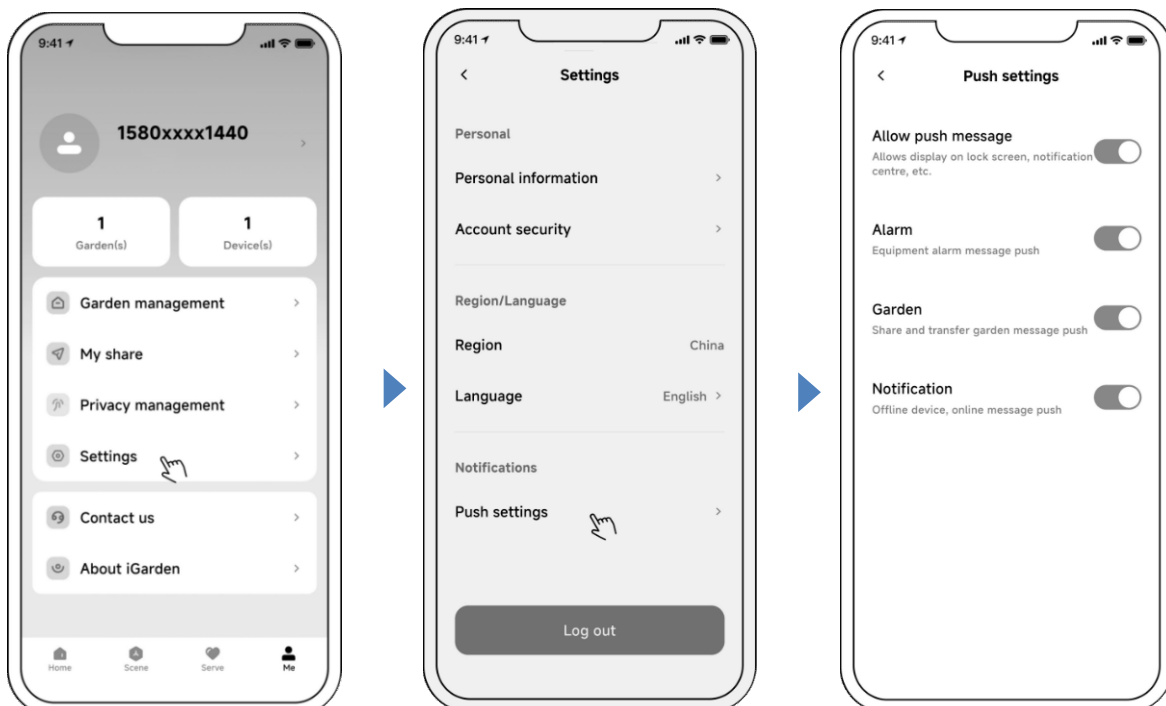


7 Message Center

A: View Message: On the device list page, click the message icon to enter the message center and view the corresponding message, as shown below: (Including: Alarm, Garden, Notify)

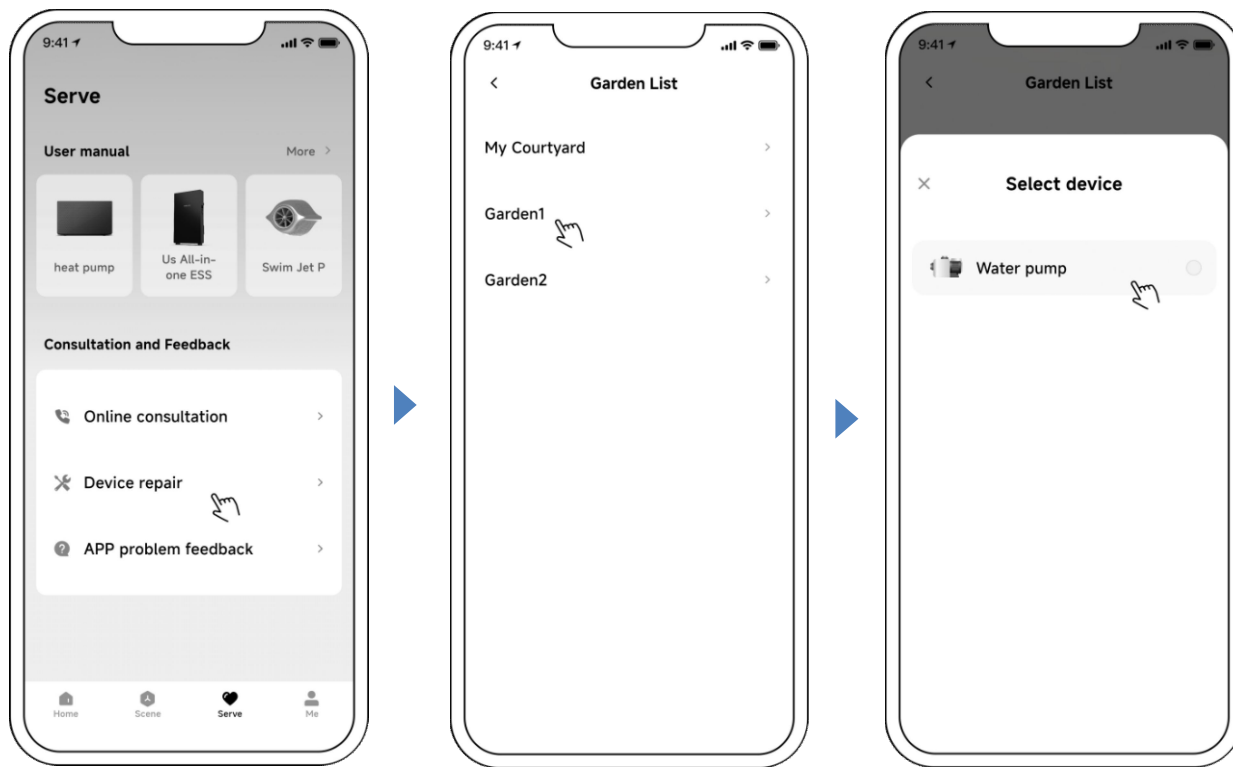


B: Push Settings: On the Settings page, click [Push Settings] to enter the Push Settings page. Users can set the push settings according to the message classification, as shown below:



8 Feedback

If you have any problem while using, welcome to send feedback to us. The process is as follows:



Notice:

- 1) The 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) The 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 control = WIFI control

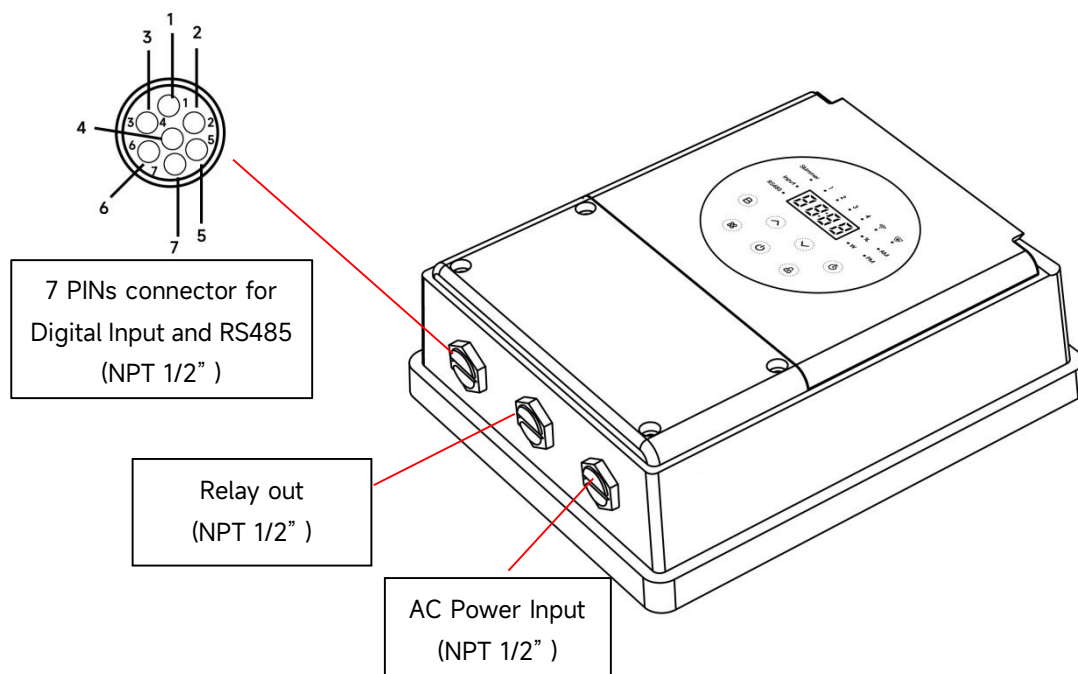


Figure 6 - Connection ports

External Control	Color	Description	Note
Digital Input	Red	Di4 (Digital Input 4)	Default speed=40%; Cables are provided by installers.
	Black	Di3 (Digital Input 3)	Default speed=80%; Cables are provided by installers.
	White	Di2 (Digital Input 2)	Default speed=100%; Cables are provided by installers.
	Grey	Di1 (Digital Input 1)	Stop; Cables are provided by installers.
	Yellow	Digital Ground	COM; Cables are provided by installers.
RS485	GND	/	Cables are provided by installers.
	Brown	RS485-B	
	Green	RS485-A	
	+12V	/	
Relay Output	/	/	Dry contact;
	/	/	Cables are provided by installers.

a. Digital Input

Running capacity is determined by the state of digital input,

- 1) When Di1 connects with COM, the indicator of digital input function  and  will light up, the pump will be mandatory to stop ; if disconnected, the digital control will be invalid;
- 2) When Di2 connects with COM, the indicator of digital input function  and  will light up, the pump will be mandatory to run at 100%; if disconnected, the control priority will be back on panel control;
- 3) When Di3 connects with COM, the indicator of digital input function  and  will light up, the pump will be mandatory to run at 80%; if disconnected, the control priority will be back on panel control;
- 4) When Di4 connects with COM, the indicator of digital input function  and  will light up, the pump will be mandatory to run at 40%; if disconnected, the control priority will be back on panel control;
- 5) The capacity of inputs (Di2/Di3/Di4) could be modified according to the parameter setting.

b. RS485

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

Note: the pool pump is compatible with P type、H type and J type control system. Please refer to the following table for wiring and setup instructions.

RS485 PIN	GND	B(Brown)	A(Green)	+12V	Note
Madimack	Not used	✓	✓	Not used	-
P type	Not used	2(GRN)	3(YEL)	Not used	1. Wire to RS485 COM PORT 2. Choose Pump Type : VS
H type	4(Optional)	3	2	Not used	Wire to Low Speed Bus Connections
J type	Not used	3(YEL)	2(BLK)	Not used	Wire to RS485 Network(red terminal bar)

c. Relay Output

To enable relay output function, please follow the connection diagram (Refer to Figure 7) to connect the pump with the external device.

There are two operational modes for the relay output , depending on the status of the Timer Synchronization on the APP (Refer to Section 5.7, Note No. 9):

- Mode 1: When Sync=0

1) The relay contacts will close once the pump starts running (following the completion of the self-priming process).

2) The relay contacts will open when the pump stops.

- Mode 2: When Sync=1 (Pump must be paired with the APP)

The state of relay output function will follow to the relay timer setting on the APP (Refer to section 6, part.4).

Note:

1) Relay contacts are rated at 115V/230V, Max 16A.

2) Please ensure the requirements of the external device to be connected to the auxiliary load do not exceed above rating.

3) Due to potential risks of fire, electric shock, or personal injury, the pump and any auxiliary loads must be installed in compliance with the National Electrical Code® (NEC®) or the Canadian Electrical Code (CCE) all applicable local electrical and safety regulations.

4) Connection cables are provided by customers.

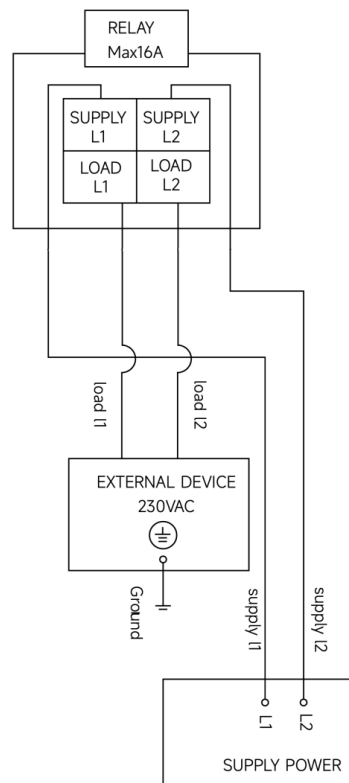


Figure 7 - Relay Output connection diagram

8. PROTECTION AND FAILURE

8.1. High-Temperature Warning and Speed Reduction - AL01

During normal operation (except backwash/self-priming), when the module temperature reaches the high-temperature warning trigger threshold (81°C), it enters the high-temperature warning state; when the temperature drops to the high-temperature warning release threshold (78°C), the high-temperature warning state is released. The display area alternately displays AL01 and running speed.

If AL01 is displayed, the running capacity will be automatically reduced as below:

- 1) If current operating capacity is higher than 85%, the running capacity will be automatically reduced by 15%;
- 2) If current operating capacity is between 70% and 85%, the running capacity will be automatically reduced by 10%;
- 3) If current operating capacity is lower than 70%, the running capacity will be automatically reduced by 5%.

8.2. Undervoltage Protection - AL02

When the device detects that the input voltage is less than 198V, the device will limit the current running speed. The display area alternately displays AL02 and running speed.

- 1) When the input voltage is less than or equal to 180V, the running capacity will be limited to 70%;
- 2) When the input voltage range is within 180V - 190V, the running capacity will be limited to 75%;
- 3) When the input voltage range is within 190V - 198V, the running capacity will be limited to 85%.

8.3. Freeze Protection - AL03

The pump must be protected when freezing temperatures are expected. Users can activate the freeze protection function, set the temperature and running speed of the freeze protection in parameter setting. (see 5.11, parameter No.13).

The freeze protection function only could be activated when the pump is in OFF state (stand by). When the freeze protection function is activated, the On/Off button  and indicator  will light up. Users can cancel this function by pressing on/off button  .

After activating the freeze protection function, when the pump is stopped and the ambient temperature drops below the set point of temperature , the pump will automatically turn on and continuously run for 1 hour. The display area alternately displays AL03 and running speed.

8.4. Troubleshooting

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

8.5. Error Code

When the device detects a failure, it will stop automatically and display the error code. After stopping for 15 seconds, check if the failure is cleared. If cleared, the pump will resume working.

Item	Error Code	Details	
1	E001	Description	Abnormal input voltage: the power supply voltage is out of the range of 165V to 275V.
		Process	The pump will stop automatically for 15 sec and resume working if it detects the power supply voltage is within the range.
2	E002	Description	Output over current: The peak current of the pump is higher than the protection current.
		Process	The pump will stop automatically for 15 sec and then resume working, if this occurs for three times continuously, the pump will shut down and need to be checked and restarted manually.

3	E207	Description	No water protection: The pump is lack of water.
		Process	Stop the pump manually, fill up the pump with water and restart it. If this occurs for twice continuously, the pump will shut down and need to be checked manually.
4	E102	Description	Heat sink error: The heat sink temperature reaches 91°C for 10sec. Or the heat sink sensor detects an open or short circuit.
		Process	1、The pump will stop automatically for 30 sec and resume working if it detects the heat sink temperature is less than 81°C. 2、The pump will stop automatically for 15 sec and resume working if it detects the heat sink sensor is not open or short circuit.
5	E103	Description	Master driver board error: The Master driver board is faulty.
		Process	The pump will stop automatically for 15 sec and then resume working, if this occurs for three times continuously, the pump will shut down and need to be checked and restarted manually.
6	E104	Description	Phase-deficient protection: Motor cables are not plugged into the master drive board.
		Process	The pump will stop automatically for 15 sec and then resume working, if this occurs for three times continuously, the pump will shut down and need to be checked and restarted manually.
7	E203	Description	RTC time reading error: Reading and writing the information of timer clock is incorrect.
		Process	The pump needs to be powered off and restarted manually.
8	E204	Description	Display Board EEPROM reading failure: Reading and writing the information of display board EEPROM is incorrect.
		Process	The pump needs to be powered off and restarted manually.
9	E205	Description	Communication Error: The communication between display board and master driver board is failure lasts 15 sec.
		Process	The pump will stop automatically for 15 sec and resume working if it detects the communication between display board and master driver board lasts 1 sec.
10	E209	Description	Loss of prime: The pump cannot self-priming due to the reasons such as exceeding the suction range or the pipeline is too complicated.
		Process	Check the pump or pipeline that there is no leakage, and then fill up the pump with water and restart it.

9. MAINTENANCE

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). Disconnect 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 and 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, and replace it.
- 6). Check the lid O-ring for stretching, tears, cracks or any other damage
- 7). Replace the lid, hand tightening is sufficient.

Note: Periodically inspecting and cleaning the strainer basket will help prolong its life.

10. SHAFT SEAL CHANGE INSTRUCTIONS

-  **WARNING:** Disconnect all electrical power service to pump before beginning shaft seal replacement.
- Only qualified personnel should attempt rotary seal replacement. Contact your local authorized dealer or service center if you have any questions.
- Refer to Figure 8 for pump component locations.

CAUTION: Exercise extreme care in handling both the rotating and the stationary sections of the two-part replacement seal. Foreign matter or improper handling will easily scratch the graphite and silicon carbide sealing surfaces.

10.1. Removing the Motor Assembly

- Remove the bolts which hold the motor assembly to the pump/strainer housing.
- Slide the motor assembly out of the pump/strainer housing, exposing the diffuser. Remove the diffuser screws and pull the diffuser off of the seal plate to expose the impeller.

10.2. Removing the Impeller

- To prevent the motor shaft from turning, secure using a M17 hex wrench in the socket on the motor shaft.
- Rotate the impeller screw clockwise (note that screw has left-hand thread) and remove. Remove the impeller by rotating counterclockwise.

10.3. Inspect the mechanical seal

- Inspect the sealing surfaces of the rotating and stationary rings for scratches, cracks, wear, or corrosion; if any of these conditions are present, they must be replaced immediately.
- Check the sealing O-ring for signs of aging, hardening, cracking, or deformation; if any of these conditions are present, it must be replaced immediately.

10.4. Replacing the Mechanical Seal

- Remove the rotating ring from the impeller and the stationary ring from the seal plate.
- Clean dirt and rust from the sealing cavity and shaft surface, ensuring that the mounting surface is flat and smooth.
- Use a new mechanical seal that matches the original model, and apply a small amount of suitable lubricant (such as a silicone-based lubricant) to the sealing surfaces to prevent scratching during installation.
- Press the stationary ring of the mechanical seal into the groove of the seal plate, with the polished silicon carbide surface facing outward; then install the rotating ring of the mechanical seal onto the impeller.

10.5. Reassemble the pump

- Fix the impeller onto the motor shaft, and install the diffuser onto the mechanical seal plate.
- Reassemble the pump body and motor assembly, and secure them with bolts.

Limited Warranty

Standard Conditions: Madimack LLC (USA) provide the following limited warranties. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state or province to province.

IMPORTANT - Full Terms and durations:

For a complete list of warranty periods and product-specific terms, please visit the warranty section at www.madimack.com/us.

Statutory Rights: This document sets forth the comprehensive terms and conditions governing the warranty provided by Madimack. These terms are in addition to, and not a modification of or subtraction from, the statutory warranties and other rights and remedies contained in applicable local legislation.

Limited Warranty Coverage: Please visit www.madimack.com/us for full duration and product-specific terms. Madimack will, at its discretion, repair or replace any product proven to be defective in materials or manufacture during the warranty period. This warranty applies to domestic installations only, is personal to the original purchaser, and is non-transferable.

Exclusions: To the extent permitted by law, Madimack excludes all statutory or implied conditions and warranties. Madimack shall not be liable for any incidental or consequential damages (such as water loss or damage to surrounding structures). The following exclusions apply:

- Incorrect installation or operation resulting from failure to follow provided instructions.
- Damage caused by misuse, neglect, or "acts of God."
- Repairs or servicing performed by unauthorized dealers.
- Faults caused by the use of non-specified accessories or chemicals.
- General wear and tear of consumable items (e.g., seals, O-rings).

Procedure for Warranty Claims:

1. Initial Contact: Owners must contact Madimack via the online portal at www.madimack.com/us or the support numbers listed below.
2. Remote Troubleshooting: A service agent will attempt to resolve the issue via phone or email.
3. Service Type Determination:
 - a. Return-to-Base: For portable or shippable units, you are responsible for disconnecting and transporting the product to an authorized service center. You are responsible for all freight and insurance costs to and from the supplier.
 - b. On-Site Service: For fixed equipment, Madimack may coordinate an on-site technician. You are responsible for providing clear and safe access to the unit.
 - c. Labor & Removal: You are responsible for the costs of removing the defective product and reinstalling the repaired/replacement product.

Required Documentation: All claims must include:

1. Proof of original purchase (Invoice with owner name and address).
2. A "Goods Return Authorization" or Service Ticket number provided by Madimack.

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