Operation Guide

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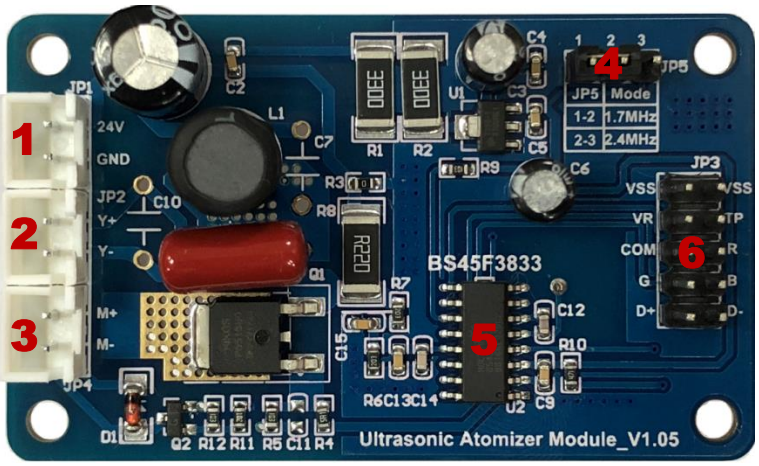
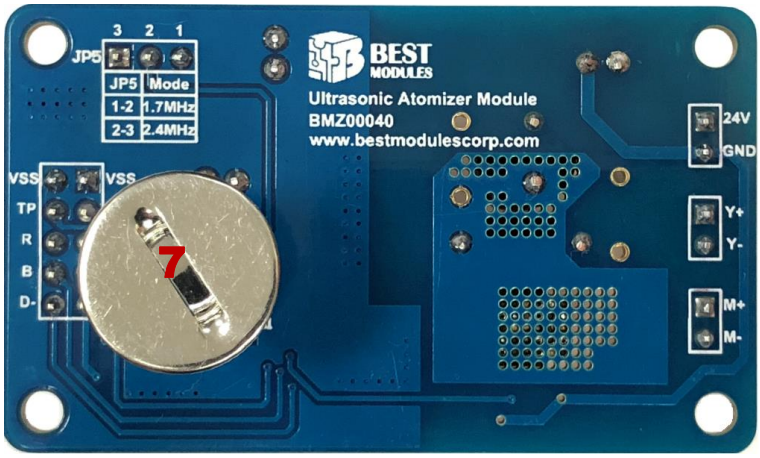
Module Introduction

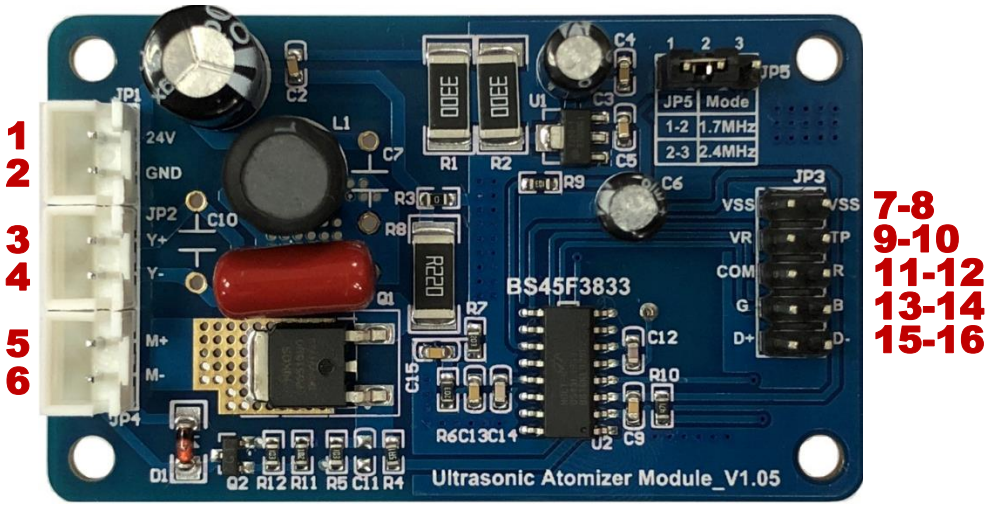
An outline of the water atomization module BMZ00040 is shown below.





1. Power interface: 2-pin connector, pitch=2.54mm.
2. Atomizer plate interface: 2-pin connector, pitch =2.54mm.
3. Fan interface: 2-pin connector, pitch =2.54mm.
4. Atomizer frequency selection: 3-pin header + jumper cap.
5. IC: Holtek BS45F3833
6. Peripheral interface: 2×5 pin header, pitch =2.54mm.
7. Water level detection spring.

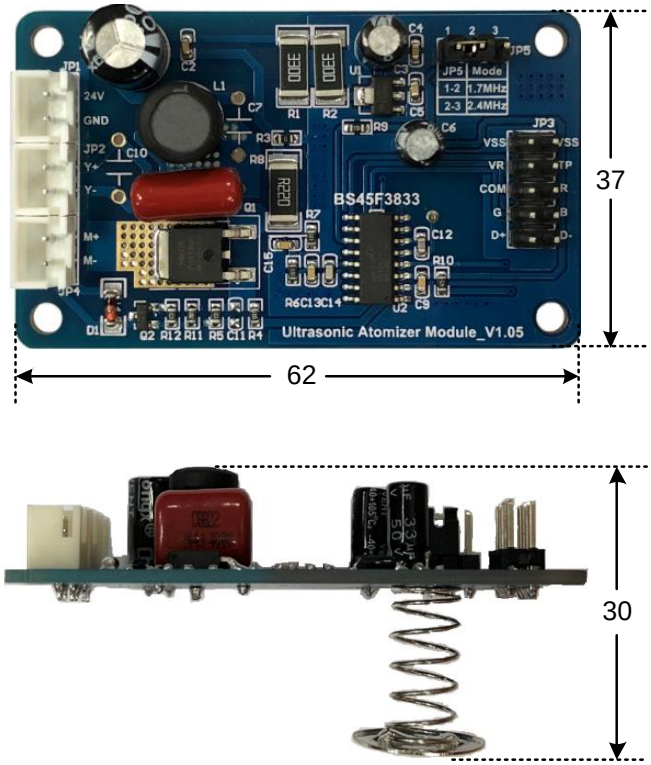
Pin Functions



Pin No.	Function	Description
1	24V	Positive power
2	GND	Negative power
3	Y+	Atomizer plate positive terminal
4	Y-	Atomizer plate negative terminal
5	M+	24V fan positive terminal
6	M-	24V fan negative terminal
7	VSS	Digital ground
8	VSS	Digital ground
9	VR	Atomization power adjustment pin - externally connected to a 10K variable resistor
10	TP	Water shortage calibration pin
11	COM	1-wire bus communication pin
12	R	Red LED driving output - PWM output
13	G	Green LED driving output - PWM output
14	B	Blue LED driving output - PWM output
15	D+	Module status LED positive terminal
16	D-	Module status LED negative terminal

Dimensions

Unit: mm



D.C. Characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
V	Operating Voltage	—	—	23	24	25	V
I	Operating Current	24V	Maximum power	—	0.42	—	A

Module Status Indication

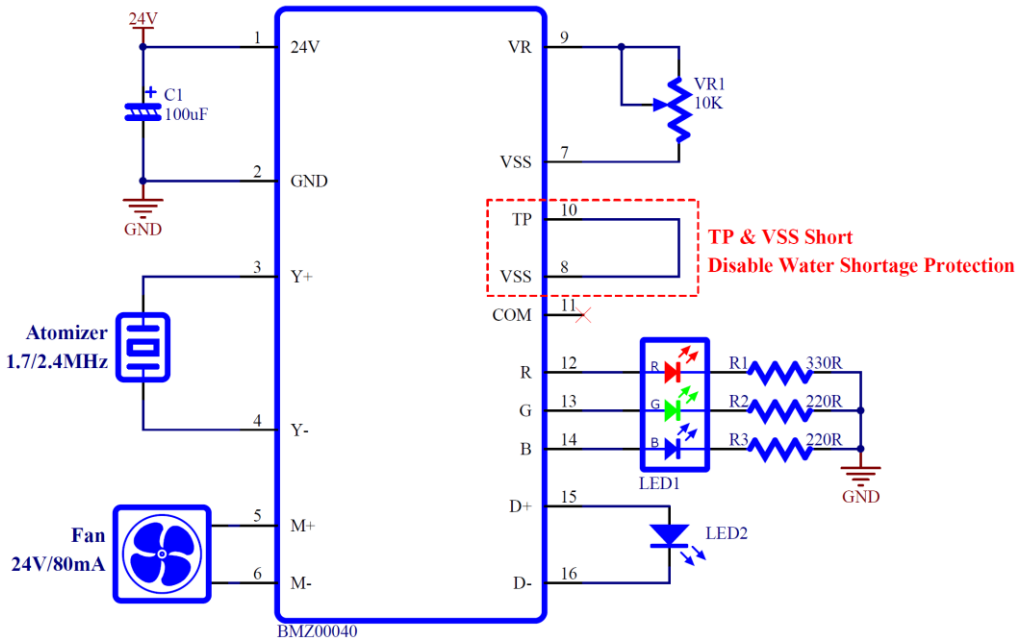
Connect an LED to the D+/D- pins to observe the module's operating status, as below.

No.	LED Status	Functional Description
1	Remain ON	Module is in normal operation
2	ON-10S→OFF-0.1S→ON-10S→OFF-0.1S…	Water shortage protection disabled
3	ON-1S→OFF-1S→ON-1S→OFF-1S…	Water shortage alarm
4	ON-0.1S→OFF-1S→ON-0.1S→OFF-1S…	Enter the water level calibration mode
5	ON-0.2S→OFF-0.2S→ON-0.2S→OFF-0.2S…	Abnormal status - over current protection or water level calibration failed

Application Circuit

Standalone Mode - Water Shortage Protection Disabled

In this mode the module operates without connecting to an external MCU, the water shortage protection is disabled. Only a few peripheral components are required to achieve atomization and RGB LED control.

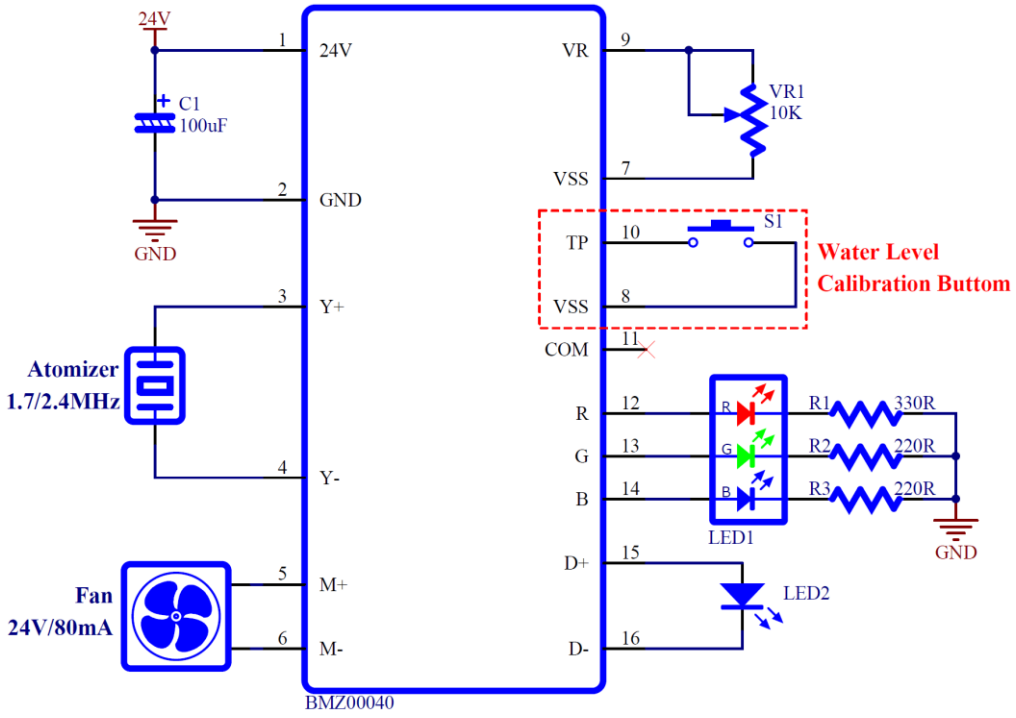


Note：The water shortage detection function is disabled in this mode. When there is no water the atomizer plate will be damaged. Ensure the atomizer plate is always beneath the water in this application mode.

VR1 is used to adjust the atomization power. When VR1 is not connected, the module will operate at maximum power by default.

Standalone Mode - Water Shortage Protection Enabled

In this mode, the module operates alone with the water shortage protection function enabled. The water shortage detection function is executed in real-time to prevent the atomizer plate from being damaged due to water shortage.



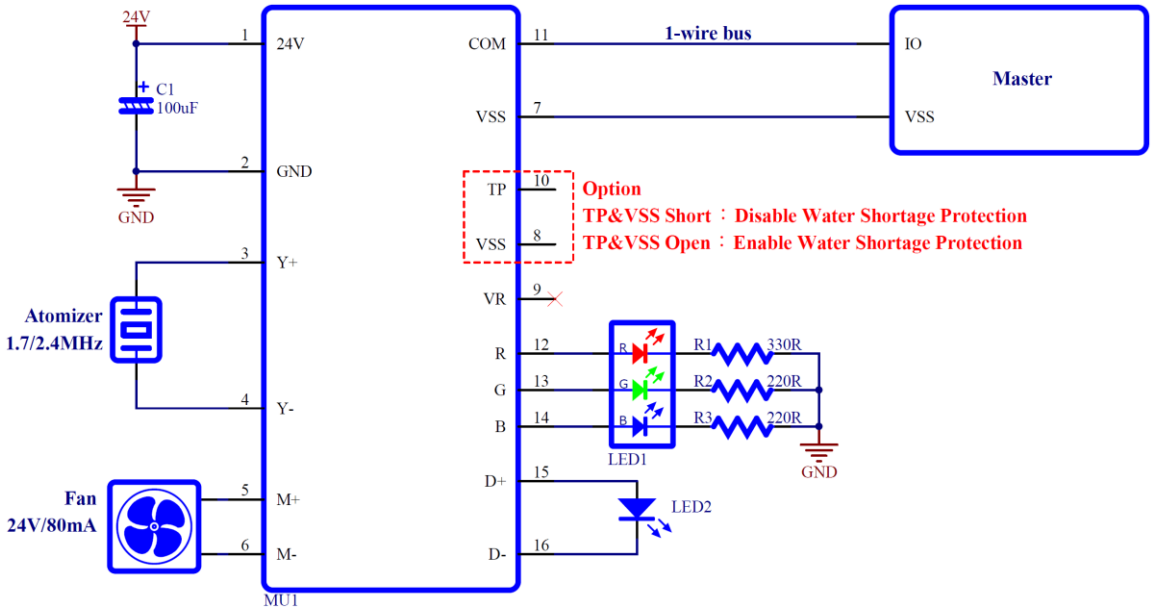
Note：The water level detection spring should be close to the bottom of the water container. Arrange a proper installation position to ensure the function is operated correctly. More details are provided in the Module Installation section.

VR1 is used for atomization power adjustment. When VR1 is not connected the module will operate at maximum power by default.

Key S1 is used for water level calibration; refer to the Water Level Calibration section for details.

Networking Mode

In this mode, the module may be configured by an external host MCU. According to the module communication protocol, the host MCU controls the module functions through the 1-wire bus.

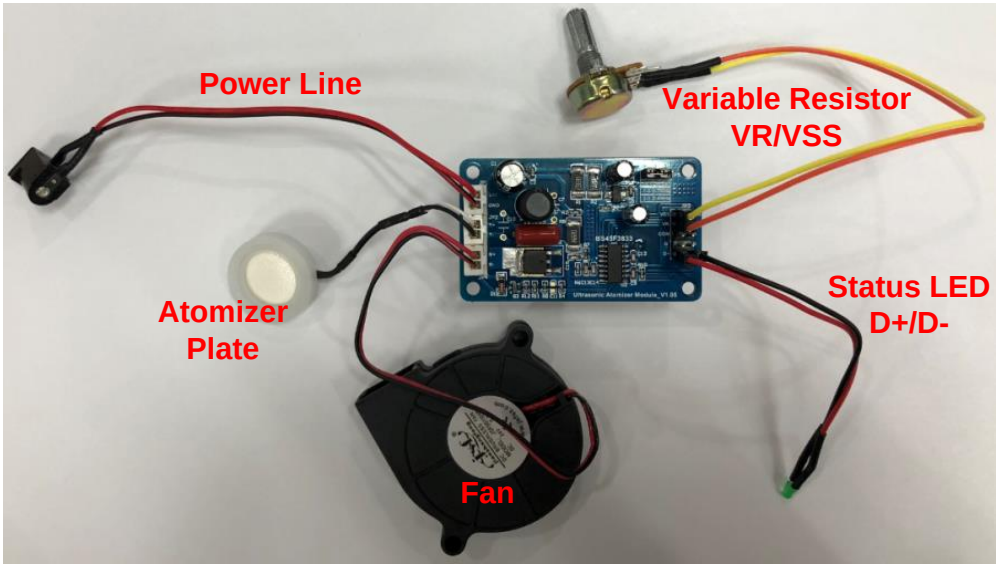


Note：In the networking mode, if the TP pin is connected to VSS, the water shortage protection function is disabled. However, the water shortage protection function will be enabled if the TP pin remains floating.

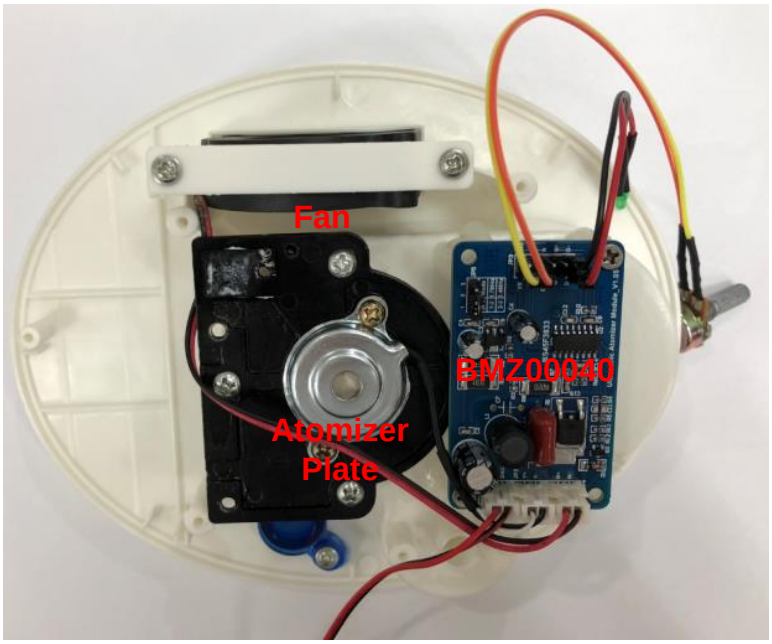
For communication protocol details, refer to the 1-wire bus communication protocol document.

Module Installation

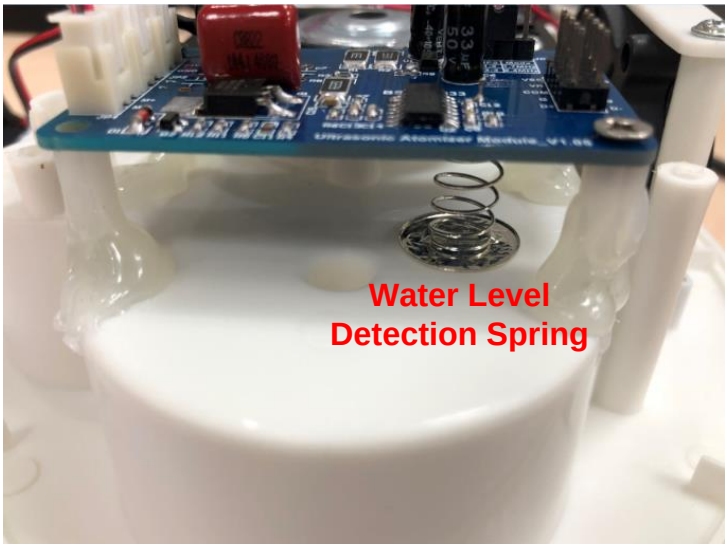
The BMZ00040 module uses a spring for water shortage detection, which should be taken into account during module installation. The following figures show an example of the module installation.



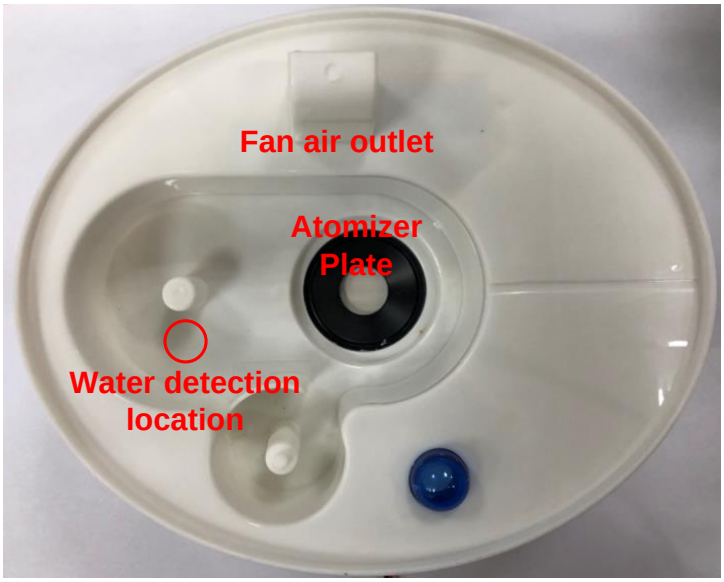
Module Peripheral Connections



Module installed on the device



Spring contact with the device

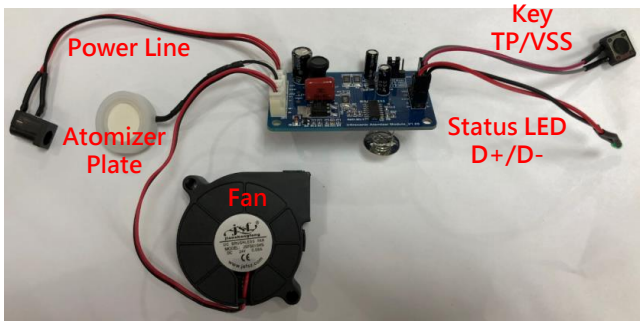
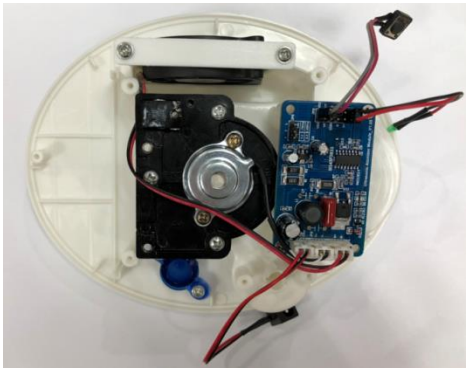


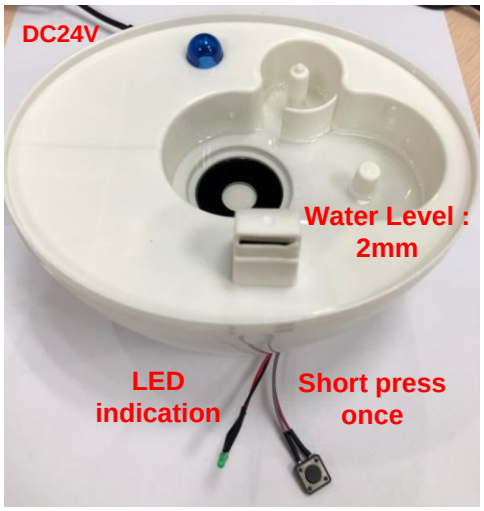
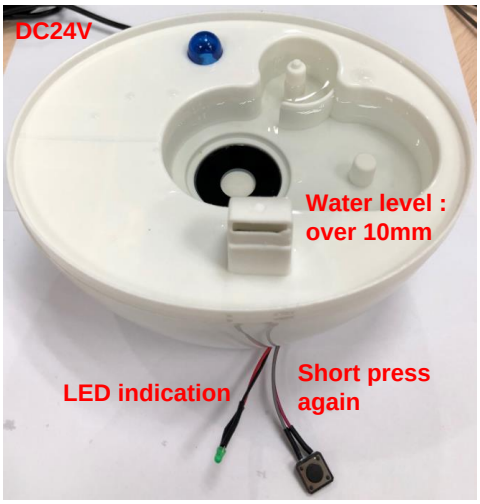
Installation Complete

Water Level Calibration

The module uses a spring for water level detection. The water shortage detection is implemented by detecting the water level in real-time and comparing it to the preset water shortage alarm threshold. The water shortage alarm threshold can be configured according to the device used. Both hardware and software calibration methods are shown below.

Hardware Water Level Calibration

Step	Description	Figure
1	Connect all required peripheral components to the module: power line, atomizer plate, fan, status LED and calibration key.	
2	Install the module to the device as suggested.	
3	Place the device on a horizontal surface. The power line, status LED and key remain outside of the device.	

Step	Description	Figure
4	Add a small amount of water to the device with a suggested water level of 2mm, connect a DC24V power supply and press the key once. The LED will then indicate that it has entered the calibration mode: ON-0.1S→OFF-1S→ON-0.1S→OFF-1S…	
5	Add water to over 10mm level and press the key again. Calibration is successful if the LED remains on, after which the atomizer plate starts operating. Calibration has failed if the LED flashes at a frequency of 2.5Hz. When this occurs, power off, and then power on, perform the calibration steps again.	

Software Water Level Calibration

Software water level calibration requires the module to be connected to the host. The detailed calibration steps are as follows:

- Step 1
  Module installation, which is the same as described in the hardware calibration method.

- Step 2
  Add a small amount of water with a suggested water level of 2mm to the device. After powered on the host will start to read module water level detection value as W1.

- Step 3
  Continue to add water to a level over 10mm. The host will read the current water level value as W2.

- Step 4
  Compare W1 and W2. If W1<W2, take the average value of W1 and W2 and then write the value to the module by the host, calibration is then finished. If W1>W2, it means calibration has failed, power on again and perform the calibration steps.

Note：Refer to the hardware water level calibration mode for a module installation introduction.

For the communication protocol details, refer to the 1-wire bus communication protocol document.