External-Driving Atomiser Module

# BM52O5221-1

Revision: V1.00 Date: March 29, 2022

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## Features

- Atomisation frequency: 1.7MHz
- Operating voltage: 24V±1V
- Atomising current: 0.67±0.07A
- Atomisation rate: > 220ml/h – for reference, affected by structures
- Atomisation efficiency – atomisation rate/power: > 13.5ml/(w·h)
- Capacitance water detection
- Supports VR or PWM control
- 6-pin connector cable, total length of 15cm
- Recommended water level: 30~50mm
- EN 55014 EMC testing passed

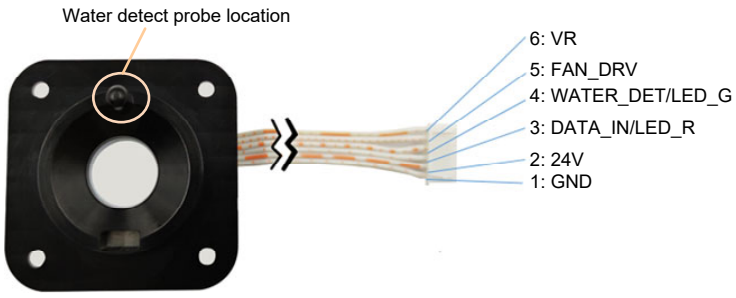
## General Description

The BM52O5221-1 external-driving atomiser module includes an integrated atomisation plate, a PCBA and related structural parts. It is mainly used in the development of humidifiers, fragrance diffusers and other atomiser products. This atomiser module provides a wide range of benefits for product designers and manufacturers. It will be easier for end-products to pass EMI tesing and the automatic frequency tracking function ensures consistency in overall power during the production process. There is also a function that ensures the atomisation process stops automatically in the absence of water which will prevent the atomisation plate from being damaged. Development costs will be reduced as only a simple circuit is required to implement the required product functions and the modular design can reduce the complexity of the production and assembly process.

## Applications

- Ultrasonic atomisation humidifiers
- Ultrasonic atomisation fragrance diffusers
- Medical atomisers
- Ultrasonic facial steamers
- Garden mist makers

## Pin Assignment



## Pin Description

| Pin No. | Function | Type | Description |
|---|---|---|---|
| 1 | GND | PWR | Ground |
| 2 | 24V | PWR | 24V power supply |
| 3 | DATA_IN | DI | PWM mode: atomisation rate control, uses PWM control |
| | LED_R | DO | VR mode: water detection result output, output high when low water is detected |
| 4 | WATER_DET | DO | PWM mode: water detection result output, output low when low water is detected |
| | LED_G | DO | VR mode: water detection result output, output high when sufficient water is detected |
| 5 | FAN_DRV | DO | Fan driving output pin |
| 6 | VR | AI | VR mode: atomisation rate control, uses VR input. If its input is floating, the atomisation will be off. This pin is for VR mode only. |

Legend: PWR: Power AI: Analog input
DI: Digital input DO: Digital output

## Functional Description

This external-driving atomiser module supports VR control and PWM control operation modes which can be selected by setting the [PIN3:PIN4] levels according to the user application requirements.

### Operation Mode Selection

During the atomiser module initialisation process, the [PIN3:PIN4] level status is sampled to select the subsequent operation mode. After power on, during the initial 20ms, the atomiser module will identify the required mode. The levels on Pin3 and Pin4, which are used for the operation mode selection, should remain for at least 20ms during the initialisation. The pin levels and the selected mode are shown in the following table.

| [PIN3:PIN4] | VR Control | PWM Control |
|---|---|---|
| PIN3 | 0 | 1 |
| PIN4 | 0 | 0 |

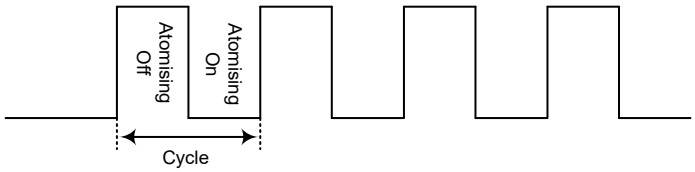
### VR Control Mode

When the module is set for VR control, the atomisation rate will be controlled using an external variable resistor without the need to connect to an external MCU for software programming. The mist output rate is adjusted within a range of 50%~100% and the atomiser is turned off by disconnecting the 24V power using the switch.

### PWM Control Mode

When the module is set for PWM control, the atomisation rate is controlled by an external PWM signal input. To do this, an external MCU is required. The mist output rate can be adjusted by changing the duty cycle of the PWM signal. The PWM has a frequency of 50±10Hz and its period should not be allowed to fluctuate during operation. The atomisation will be on when the signal is low and be off when the signal is high. The higher the ratio of the low time to a cycle time, where it must be greater than 50%, the larger the atomisation rate. If the input is floating, the atomisation will remain off.

Note: the output low time should be greater than 50% of the PWM period, otherwise unpredictable results may occur.



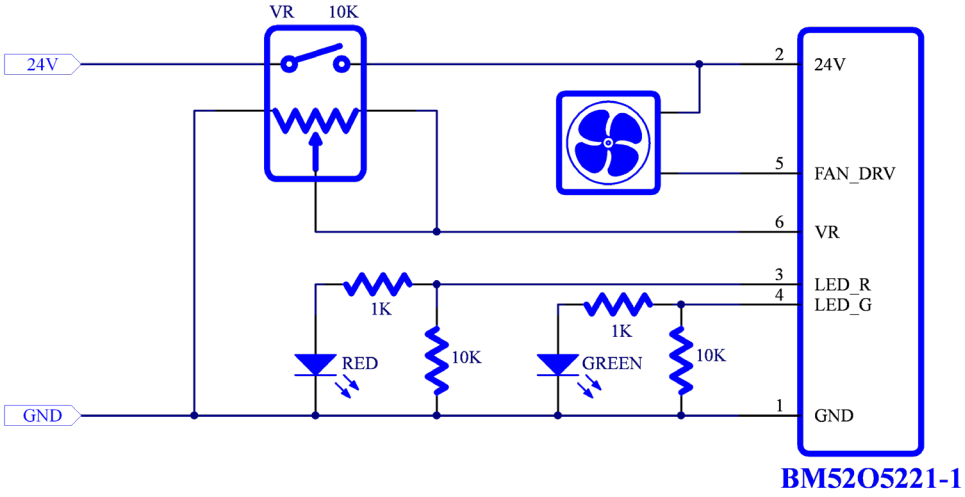

**PWM Pulse Schematic Diagram**

## Product Use Precautions

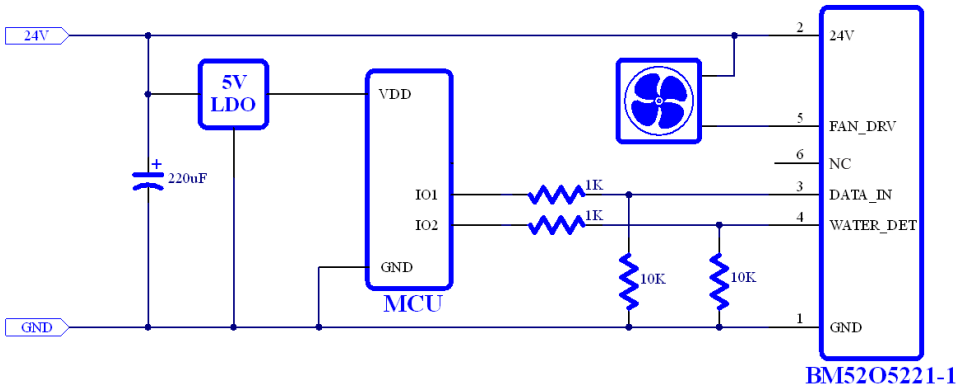
- The atomisation plate should be cleaned regularly to avoid surface scale building up which will interfere with the mist output.
- Prevent the product from receiving impacts.
- Never operate the product without water to avoid product performance degradation.
- Make sure the operating ambient temperature is between 5 to 40℃, room temperature is recommended.
- Use tap water for atomising.

## Application Circuits

### Typical Application Circuit – VR Control Mode



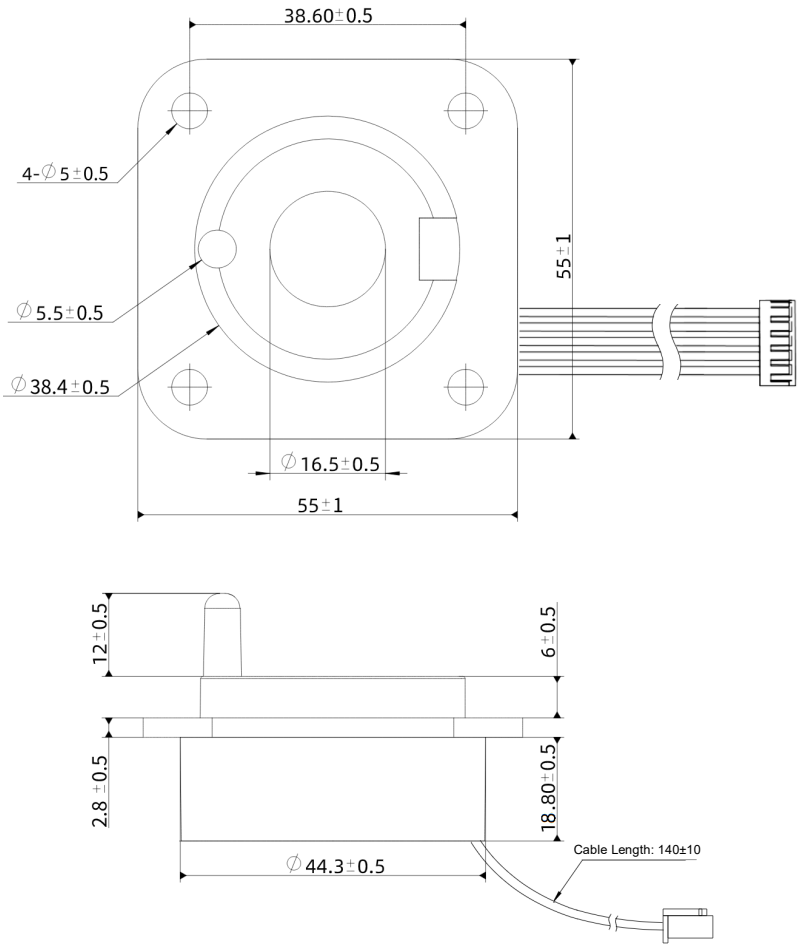
### Typical Application Circuit – PWM Control Mode




## Dimensions

### Product Outline Dimensions

(Unit: mm)



### 6-Pin Connector Dimensions

(Unit: mm)