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MO3 / MO4 Water Level Sensor: User Guide – Easyelecmodule

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6–7 minutes

What is a liquid level sensor?

A water level sensor is an electronic sensor used to detect liquid height, changes in liquid level, or the presence of a liquid. It senses the water level by utilizing electrical properties—such as resistance, capacitance, ultrasonic waves, or optical principles—and converts the result into an electrical signal. This signal can then be read by a microcontroller (like an Arduino or ESP32) or an industrial control system for applications such as tank level control, liquid level alarms, and automatic water filling or drainage systems.

M03/M04 Water Level Sensor

The MO3/MO4 Water Level Sensor is a non-contact liquid level switch that operates on a capacitive principle to detect the presence or absence of liquid. It is designed to be mounted on the outer wall of a container to detect the liquid level within.

Specifications

MODEL	M03 WATER LEVEL DETECTION MODULE	M04 WATER LEVEL DETECTION MODULE
Operating Voltage	3.3–5 V	3.3–24 V
Quiescent Current	≈ 0.6 mA	≈ 3 mA
Operating Current	≈ 2.2 mA	≈ 3.6 mA
Output Type	Push-pull output	NPN output
Product Size (L × W)	31.5 × 12 mm	31.5 × 12 mm
Sensitivity Adjustment	Change capacitor C4	Change capacitor C4
Detection Distance	3–4 mm	3–4 mm
Detection Material	Non-metal	Non-metal
Note	All current data measured under 5V supply.	

PIN	DESCRIPTION
GND	Connect to the ground of the power supply.
VCC	Connect to a 3.3V to 5V power supply.
OUT	Connect to the input port of a microcontroller or other device to receive the output signal.

Operation:

When the sensor detects the presence of liquid, it will output a low level signal.

When no liquid is detected, the sensor will output a high level signal.

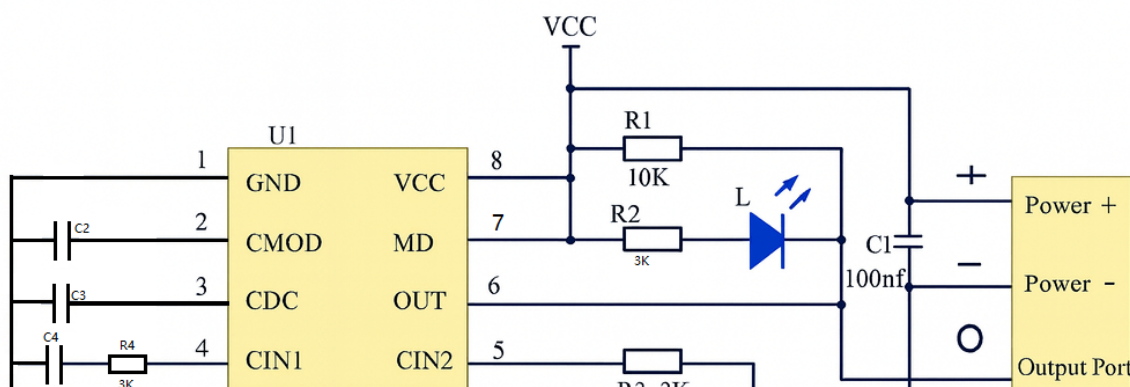
Applications

- Liquid level monitoring in pipelines
- Overflow prevention in containers
- Industrial liquid level sensing
- Non-contact liquid level detection in household appliances

Schematic

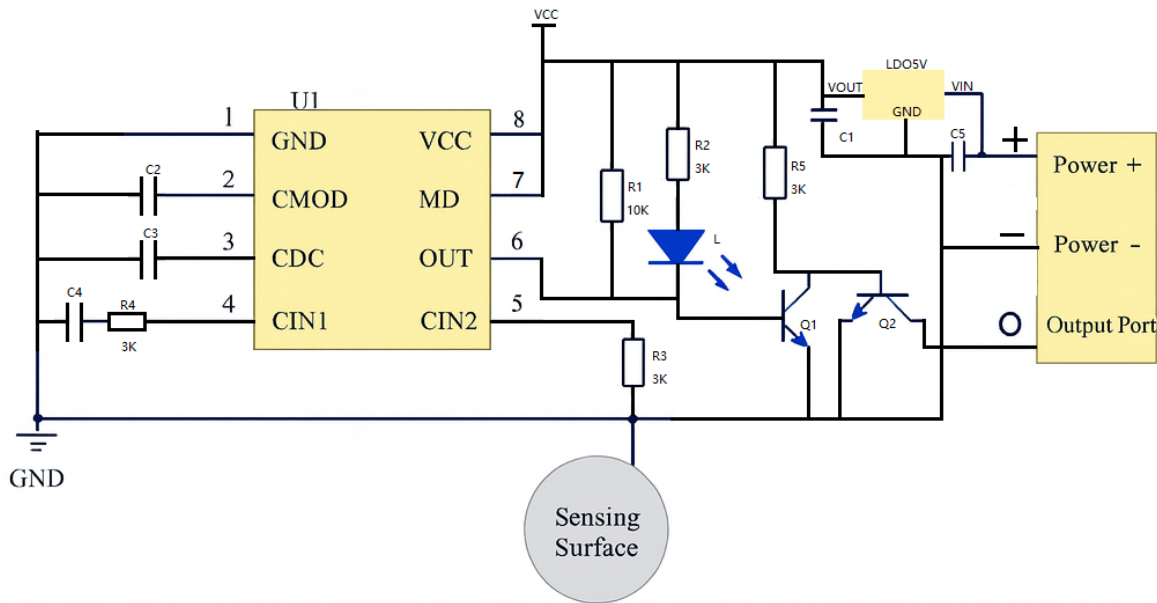
Mounted on a container's outer wall, the sensor's surface forms an equivalent capacitor with the external medium (e.g., air or liquid). As liquid nears, the dielectric constant rises, increasing the capacitance. The chip converts this capacitance change into a voltage, which an internal comparator then measures against a set threshold. Based on this, it outputs a high or low signal to indicate whether water is present.

M03 Water Level Detection Module Schematic





M04 Water Level Detection Module Schematic



M03 VS M04

PARAMETER	M03	M04
Power Supply	5 V (see PCB silk print)	Wide voltage +VIN (typically 6–36 V), onboard LDO converts to 5 V
Output Characteristics	Push-pull / quasi push-pull digital output (OUT direct)	Open-collector output (only pulls down, does not pull up)

Compatible MCU	Arduino / ESP / STM32 etc.	PLC, relay modules, 24V systems, or MCU input compatible
External Components	None required	Needs external pull-up resistor or relay load
Typical Output Logic	Logic version: Water = High level	Logic version: Water = Low level (effective low)

Arduino code

FAQ

Q1: If I use the M04 model with a 12V input, how do I connect a pull-up resistor?

A1: It depends on the device you are connecting to. If you are only connecting to a microcontroller port, you can pull it up to 5V or 3.3V as needed.

Q2: Can I connect it to a microcontroller? Is an Arduino compatible?

A2: Yes. The output is open-collector/open-drain, allowing it to interface with devices like PLCs or drive other components directly. The MO3 model can be connected directly to an Arduino. However, the MO4 model requires an external pull-up resistor because its open-drain output can only be in a high-impedance or low-level state.

Q3: What is the working principle?

A3: It outputs a low logic level when liquid is present and a high logic level when it is absent.

Q4: Can it be used to control a relay?

A4: Yes.

Q5: How do I use it?

A5: Attach the sensor directly to the container wall. When the sensor detects liquid, the indicator light will turn on, and the “OUT” pin will output a low logic level. When no liquid is detected, the light will be off, and the “OUT” pin will output a high logic level. The “OUT” pin can be connected to a microcontroller or used to control a relay.

Q6: Does the container have to be transparent? Can it be made of metal?

A6: Transparency does not matter, but the container wall thickness must be between 3mm and 4.5mm. Metal containers generally do not work because the metal will shield the electric field. For metal containers, you would need to create an observation window or switch to a contact-based sensor solution.

Q7: Can it detect substances like alcohol or oil?

A7: Yes, it can. However, it may be less sensitive (“slower to respond”) when detecting liquids with a low dielectric constant, especially if the container wall is thick. This can be compensated for by ensuring a tighter fit to the container, using a larger

electrode area, or increasing the debounce time in your code.

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