Youmile JK-YM-407

Youmile LM393 H2010 Correlation Photoelectric Sensor Instruction Manual

Model: JK-YM-407

INTRODUCTION

This manual provides detailed instructions for the Youmile LM393 H2010 Correlation Photoelectric Sensor module. This sensor is designed for applications requiring detection of objects passing through a slot, such as workpiece counting and motor speed measurement. It operates by detecting interruptions in an infrared beam.

SAFETY INFORMATION

- Ensure the power supply voltage is within the specified range (DC 5V) to prevent damage to the module.
- Avoid exposing the module to extreme temperatures, humidity, or corrosive environments.
- Handle the module with care to prevent physical damage to components or pins.
- Always disconnect power before making or changing connections.

PACKAGE CONTENTS

Verify that all items are present in your package:

- 5 x LM393 H2010 Correlation Photoelectric Sensor Modules
- 5 x Encoders (Discs)
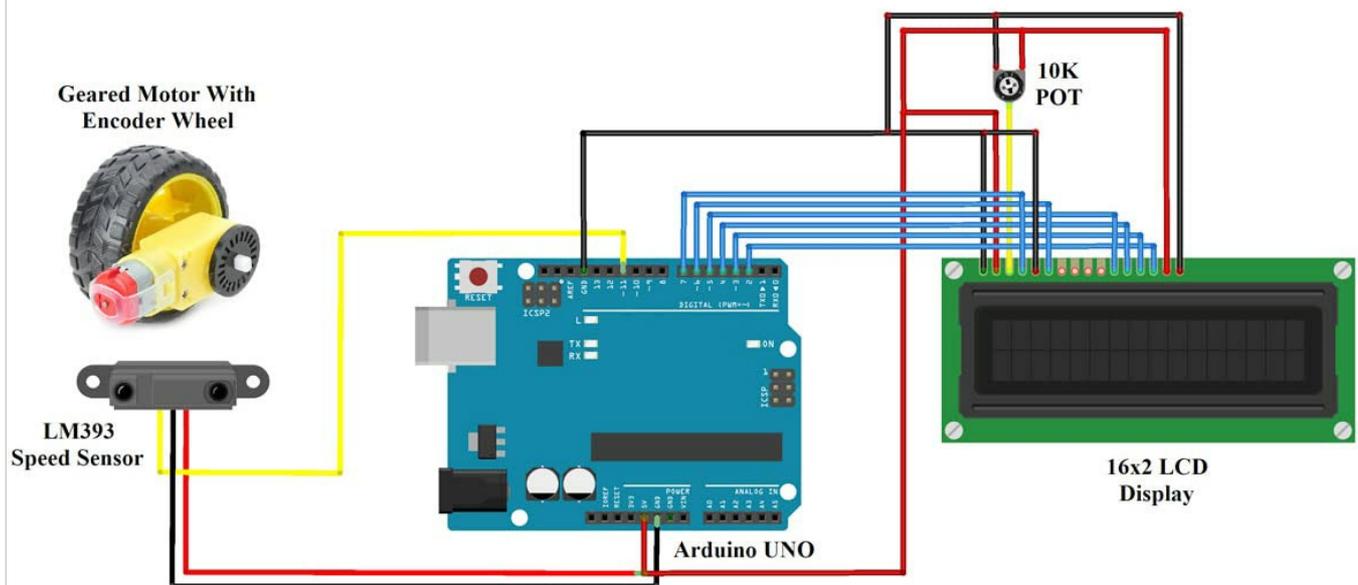- 1 x 15-pin Male and Female DuPont Cable

WIRING DIAGRAM

Figure 1: Sensor module and encoder disc included in the package. The sensor is a U-shaped component with three pins (GND, OUT, VCC), and the encoder is a circular disc with slots.

PRODUCT OVERVIEW AND FEATURES

The Youmile LM393 H2010 sensor module is a slot-type optocoupler designed for precise detection. It integrates an LM393 comparator chip for stable signal output.

- **Signal Output Indication:** The module includes an LED indicator for visual feedback on the output status.
- **Single-Channel Signal Output:** Provides a single digital output signal.
- **Output Logic:** Outputs a high level (LED light off) when an obstruction is present in the slot, and a low level (LED light on) when there is no obstruction.
- **Fixed Sensitivity:** The sensitivity of the sensor is not adjustable.
- **Applications:** Suitable for workpiece counting and motor speed measurement using an encoder disc.
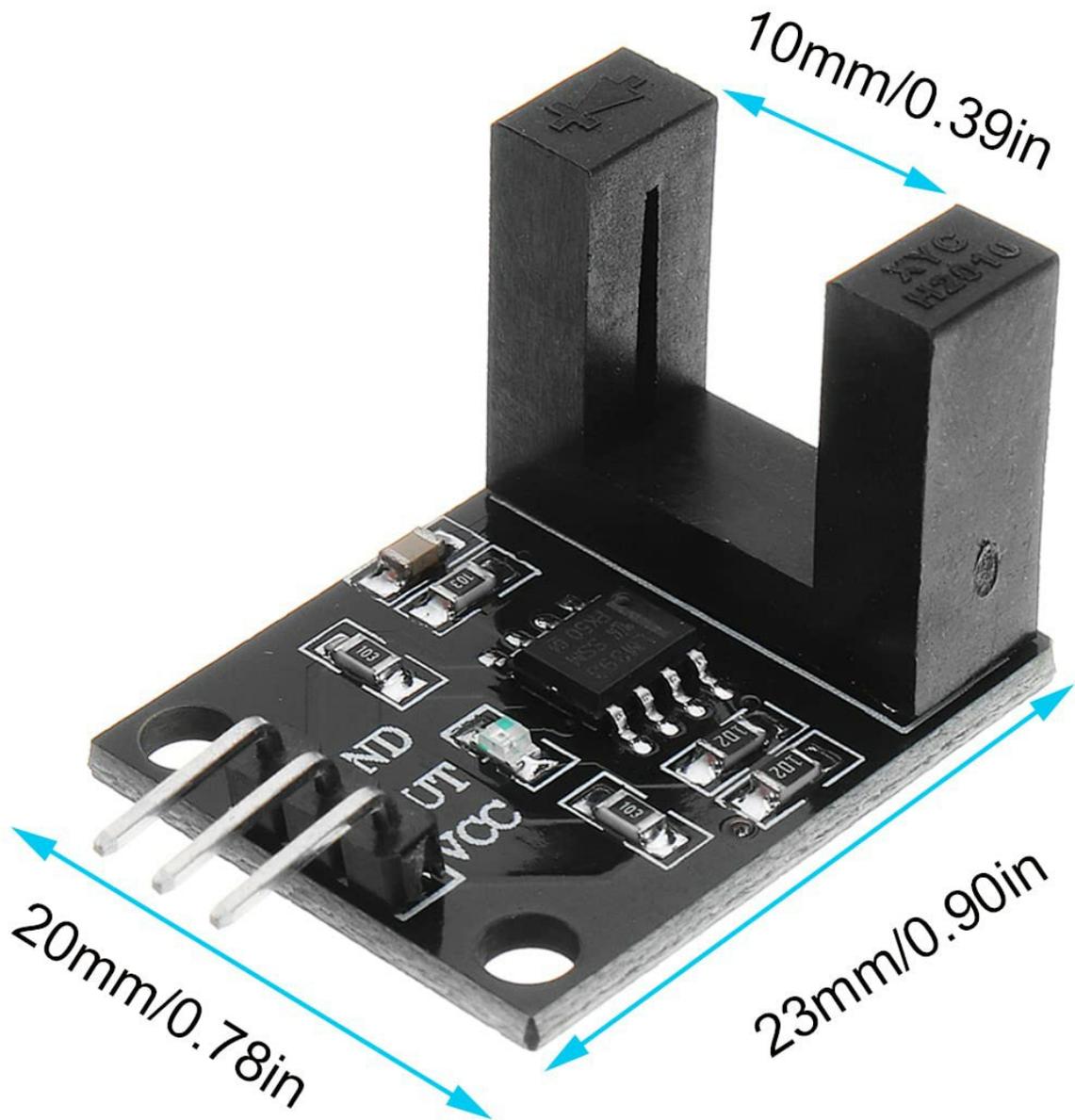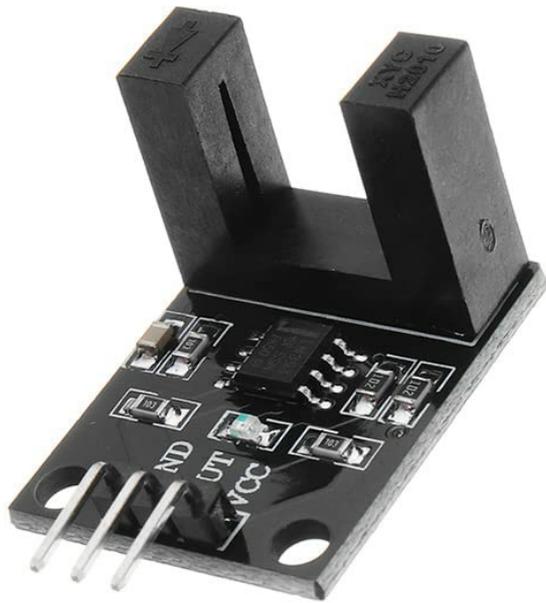- **Circuit Board Output Switch:** Refers to the digital output capability of the module.

SIZE

10mm/0.39in

20mm/0.78in

23mm/0.90in

Figure 2: Key features of the sensor module, highlighting its functional aspects.

SPECIFICATIONS

Parameter	Value
Main Chip	LM393, Slot Optocoupler H2010
Working Voltage	DC 5V
Slot Width	10 mm
Module Dimensions (L x W x H)	2.3 x 2 x 1.8 cm (0.91 x 0.79 x 0.71 inches)
PCB Hole Distance (center to center)	1.5 cm
PCB Hole Aperture	0.3 cm

Parameter	Value
Output Type	Single-channel digital signal
Sensitivity Adjustment	Not adjustable
Model Number	JK-YM-407

CIRCUIT DIAGRAM

Figure 3: Physical dimensions of the sensor module. The length is 23mm (0.90in), width is 20mm (0.78in), and slot width is 10mm (0.39in).

Correlation Photoelectric Sensor

Encoders

Figure 4: Internal circuit diagram of the sensor module, illustrating the components and their connections, including power, output, and indication LED.

SETUP AND WIRING

Follow these steps to connect your LM393 H2010 sensor module:

1. **Identify Pins:** The module has three pins:
   - **VCC:** Power supply input (DC 5V).
   - **GND:** Ground connection.
   - **OUT:** Digital signal output.

2. **Connect Power:** Connect the VCC pin to a stable 5V DC power source and the GND pin to the ground of your system (e.g., Arduino, microcontroller).

3. **Connect Output:** Connect the OUT pin to a digital input pin on your microcontroller. This pin will provide the detection signal.

4. **Integration with Encoder (for speed measurement):** If using for motor speed measurement, mount the encoder

disc onto the motor shaft. Position the sensor module so that the encoder disc passes through the sensor's slot. Ensure the disc moves freely without obstruction from the sensor housing.
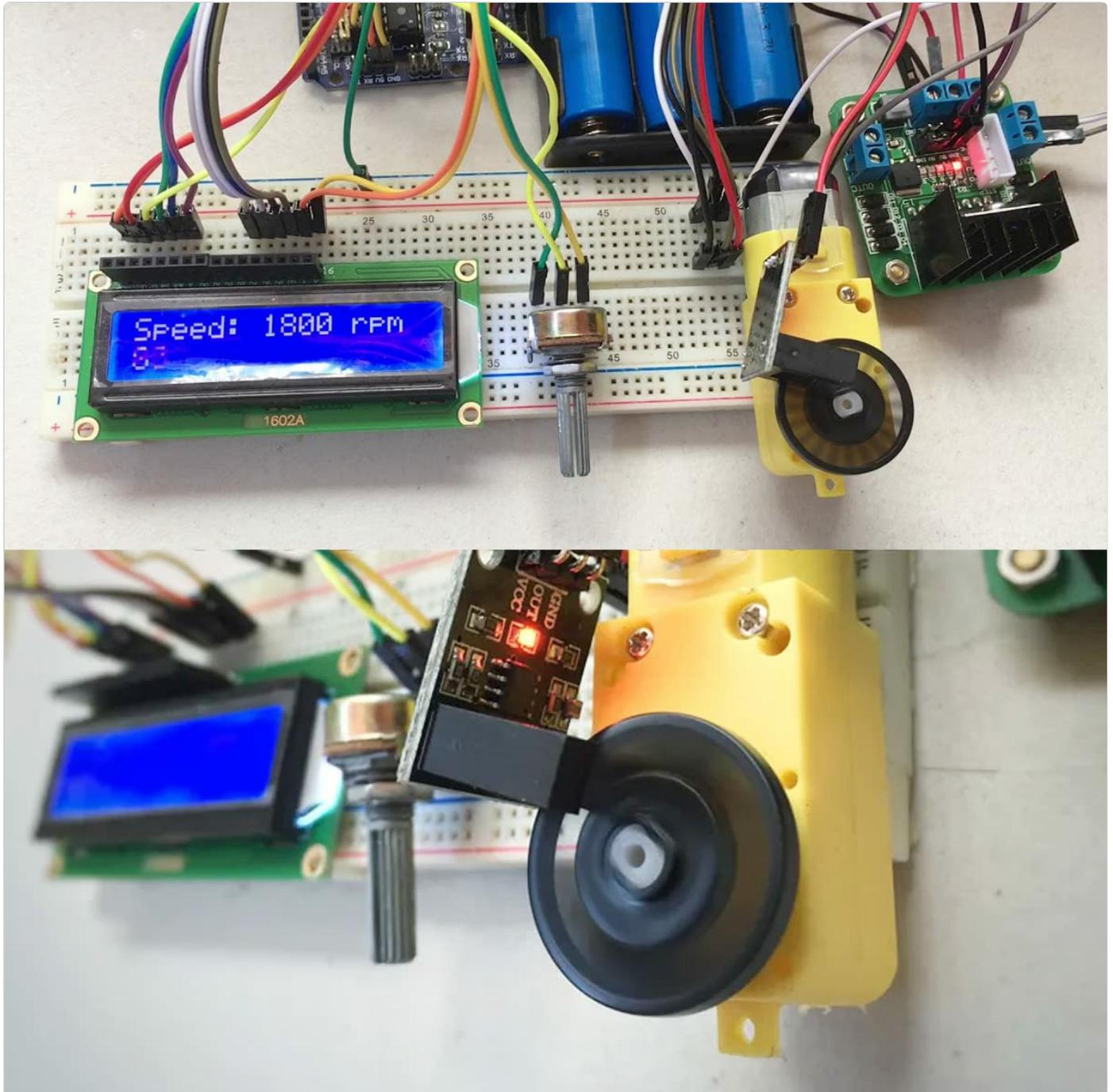

Figure 5: Example wiring diagram for motor speed measurement using the LM393 sensor with an Arduino UNO and an LCD display. The sensor detects rotations of the encoder wheel attached to the motor.

OPERATING INSTRUCTIONS

Once properly connected, the sensor operates by detecting the presence or absence of an object within its 10mm slot.

- **No Obstruction:** When the sensor's infrared beam is unobstructed (nothing is in the slot), the output pin (OUT) will be LOW, and the onboard LED indicator will be ON.
- **Obstruction Detected:** When an object (e.g., an encoder disc tooth, a workpiece) passes through the slot and breaks the infrared beam, the output pin (OUT) will go HIGH, and the onboard LED indicator will turn OFF.

Your microcontroller can read these HIGH/LOW transitions on the OUT pin to count events (like workpiece passes) or calculate speed (by measuring the frequency of transitions from an encoder disc).

APPLICATIONS

- **Workpiece Counting:** Integrate the sensor into an assembly line to count items as they pass through the slot.
- **Motor Speed Measurement:** Attach an encoder disc to a motor shaft. The sensor detects the slots on the disc as it rotates, allowing for calculation of RPM.
- **Position Detection:** Can be used to detect the presence or absence of a component at a specific point.

MAINTENANCE

- Keep the sensor's slot clean and free from dust or debris, which could interfere with the infrared beam.
- Periodically check all wiring connections to ensure they are secure.
- Store the module in a dry, non-corrosive environment when not in use.

TROUBLESHOOTING

Problem	Possible Cause	Solution
No output signal / LED always ON/OFF	Incorrect wiring, no power, faulty module, continuous obstruction/no obstruction.	Verify VCC and GND connections. Ensure 5V power is supplied. Check OUT pin connection to microcontroller. Test with a known obstruction/no obstruction.
Inconsistent readings	Loose connections, dust in slot, unstable power supply, object not fully breaking beam.	Secure all connections. Clean the sensor slot. Ensure power supply is stable. Adjust object positioning to fully interrupt the beam.
Motor speed measurement is inaccurate	Encoder disc not properly aligned, disc slipping, incorrect software logic.	Ensure the encoder disc is centered and securely attached to the motor shaft. Verify the sensor is positioned correctly over the disc. Review your microcontroller code for pulse counting and speed calculation.

WARRANTY AND SUPPORT

Specific warranty information for this product is not provided in the available documentation. For technical support or inquiries regarding your Youmile LM393 H2010 sensor module, please refer to the retailer or manufacturer's official support channels.