WINGONEER 4r

WINGONEER 50Kg Body Load Cell Weighing Sensor Instruction Manual

Model: 4r

1. Introduction

This manual provides essential information for the proper installation, operation, and maintenance of the WINGONEER 50Kg Body Load Cell Weighing Sensor. This half-bridge strain gauge sensor is designed for various weighing applications, particularly suitable for DIY projects involving microcontrollers like Arduino. Please read this manual thoroughly before use to ensure safe and effective operation.

2. Product Overview

The WINGONEER 50Kg Body Load Cell is a compact and robust weighing sensor. It operates on the principle of resistance strain, where the electrical resistance changes in proportion to the applied mechanical stress. This sensor is configured as a half-bridge, requiring an external full-bridge circuit or two such sensors to form a full bridge for accurate measurement.

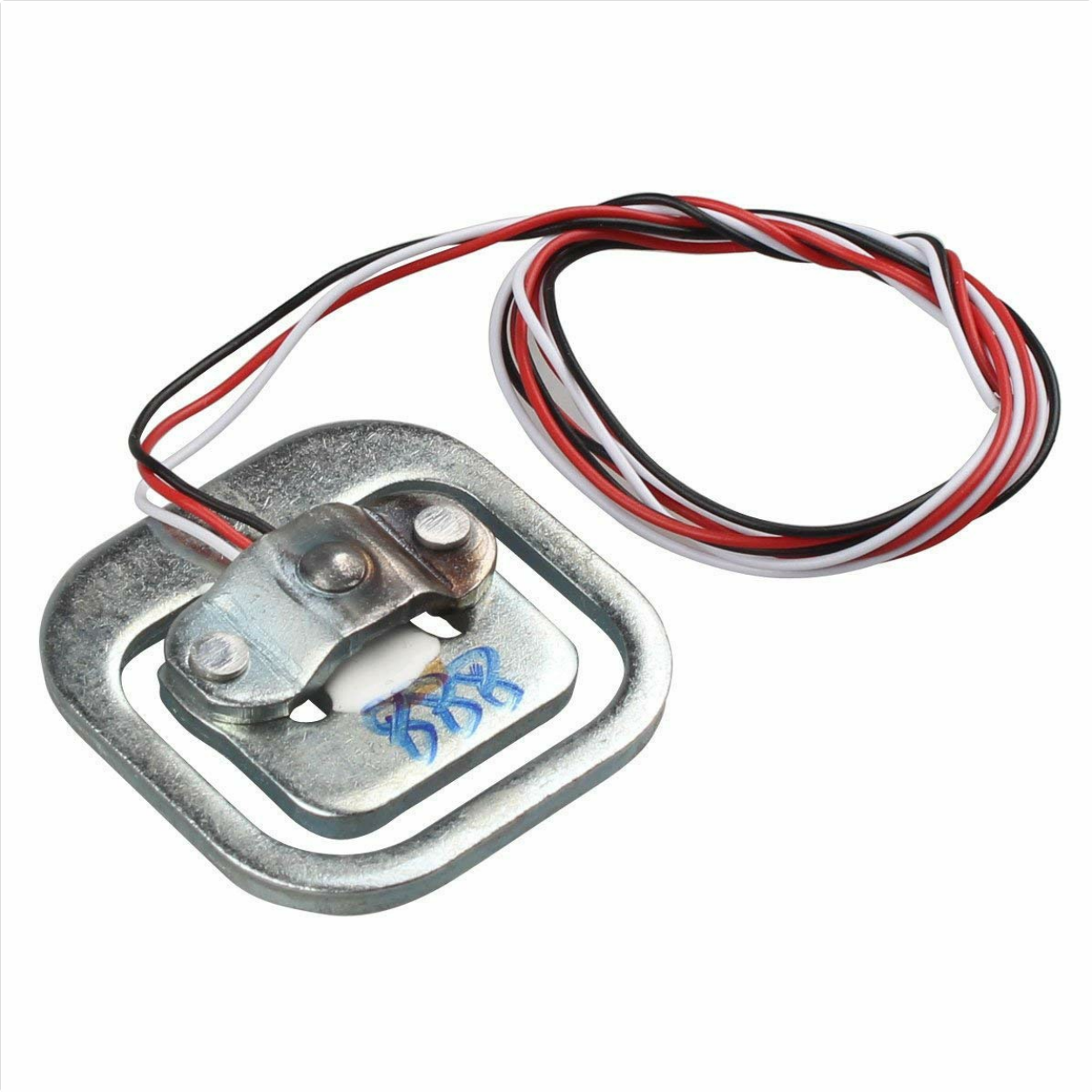

Figure 1: Top-down view of the WINGONEER 50Kg Body Load Cell with attached wires. The sensor features a central load-bearing element and four color-coded wires for connection.

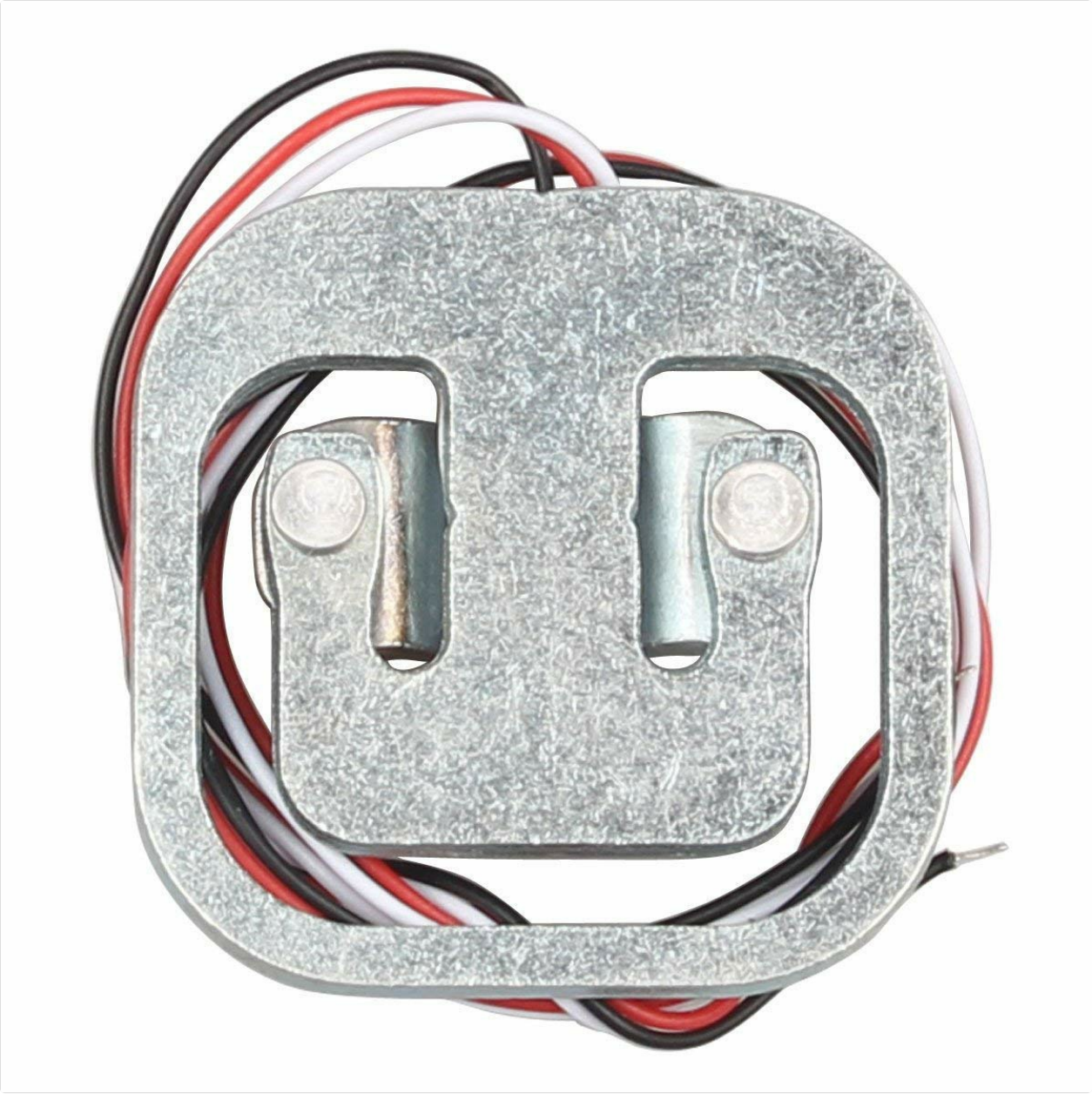

Figure 2: Bottom view of the WINGONEER 50Kg Body Load Cell, illustrating the structural design and mounting points for secure installation.

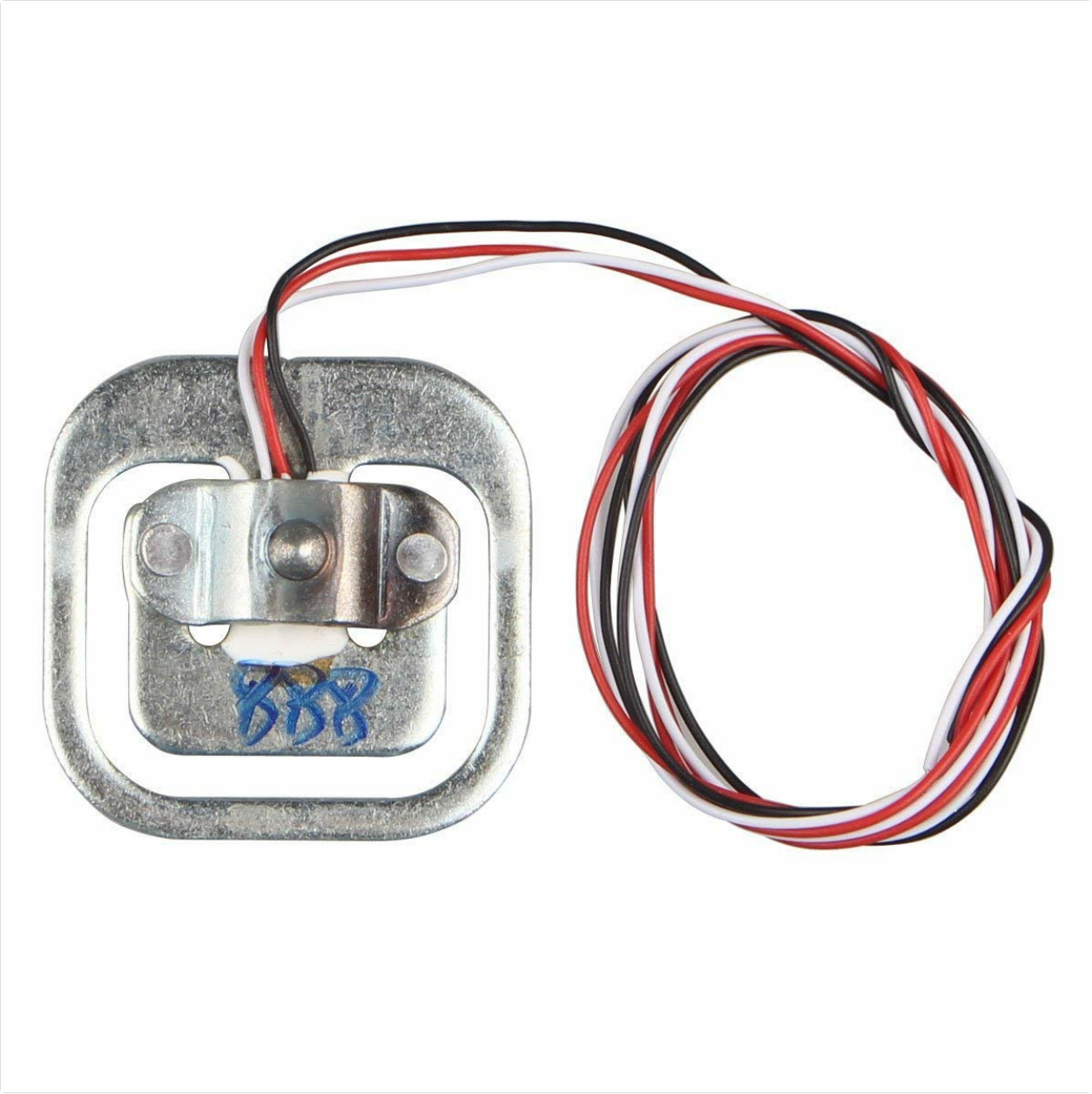

Figure 3: Angled view of the WINGONEER 50Kg Body Load Cell, showcasing its overall form factor and wire connections.

3. Specifications

Parameter	Value
Capacity	50 kg
Type	Half-Bridge Strain Gauge
Output Sensitivity	1.0 ± 0.1 mV/V
Non-linearity	0.05% F.S.
Hysteresis	0.05% F.S.
Repeatability	0.05% F.S.
Creep (30 min)	0.05% F.S.
Temperature Effect on Zero	0.05% F.S./10°C

Parameter	Value
Temperature Effect on Span	0.05% F.S./10°C
Input Resistance	1000 ± 10 Ohm
Output Resistance	1000 ± 10 Ohm
Insulation Resistance	≥ 2000 MΩ (100VDC)
Operating Temperature	-10°C to +50°C
Recommended Excitation Voltage	5-10 VDC
Maximum Excitation Voltage	15 VDC
Material	Aluminum Alloy
Wiring	Red (E+), Black (E-), White (O-), Green (O+)

4. Setup

4.1 Mounting the Load Cell

Securely mount the load cell to a stable, rigid surface using appropriate fasteners. Ensure that the load is applied directly to the designated sensing area of the load cell. Avoid applying off-center or twisting forces, as this can lead to inaccurate readings and potential damage.

4.2 Wiring Instructions

The 50Kg Body Load Cell is a half-bridge sensor. To form a complete Wheatstone bridge for measurement, you will typically need two such half-bridge sensors or one half-bridge sensor combined with two fixed resistors. An HX711 ADC (Analog-to-Digital Converter) module is commonly used with these sensors for signal amplification and digital conversion.
The sensor has four color-coded wires:

- **Red:** Excitation+ (E+)
- **Black:** Excitation- (E-)
- **White:** Output- (O-)
- **Green:** Output+ (O+)

When connecting to an HX711 module:

- Connect **Red** wire to E+ on HX711.
- Connect **Black** wire to E- on HX711.
- Connect **White** wire to A- on HX711.
- Connect **Green** wire to A+ on HX711.

For a full-bridge configuration using two half-bridge sensors:

1. Connect Red wires of both sensors together to the positive excitation voltage.
2. Connect Black wires of both sensors together to the negative excitation voltage (ground).
3. Connect the Green wire of the first sensor to the White wire of the second sensor. This connection point will be one of your differential outputs (e.g., A+ on HX711).

4. Connect the White wire of the first sensor to the Green wire of the second sensor. This connection point will be your other differential output (e.g., A- on HX711).

Note: Always refer to the specific documentation of your ADC module (e.g., HX711) for precise wiring diagrams and calibration procedures.

5. Operating Instructions

5.1 Calibration

After wiring, calibration is crucial for accurate measurements. This typically involves:

1. **Zero Calibration:** With no load on the sensor, take a reading. This establishes the baseline or 'tare' value.
2. **Span Calibration:** Apply a known weight (calibration weight) to the sensor and take a reading. Use this reading and the known weight to calculate the sensor's conversion factor (e.g., grams per ADC unit).

Most microcontroller libraries for HX711 or similar ADCs provide functions for these calibration steps.

5.2 Taking Measurements

Once calibrated, the sensor will output a raw analog signal proportional to the applied load. The ADC module converts this into a digital value. Your microcontroller code will then apply the calibration factor to convert this digital value into a meaningful unit of weight (e.g., grams, kilograms).
Ensure the load is applied smoothly and centrally to the load cell for consistent readings. Avoid sudden impacts or vibrations during measurement.

6. Maintenance

The WINGONEER 50Kg Body Load Cell is designed for durability and requires minimal maintenance. Follow these guidelines:

- **Keep Clean:** Regularly clean the sensor surface to prevent accumulation of dust or debris that could interfere with its operation. Use a soft, dry cloth.
- **Avoid Overload:** Do not exceed the rated capacity of 50 kg. Overloading can permanently damage the strain gauges.
- **Protect from Environment:** While robust, protect the sensor from excessive moisture, extreme temperatures, and corrosive substances unless specifically designed for such environments.
- **Inspect Wiring:** Periodically check the wiring for any signs of wear, fraying, or loose connections.

7. Troubleshooting

- **Inaccurate Readings:**
  - *Possible Cause:* Improper calibration. *Solution:* Re-calibrate the sensor following the steps in Section 5.1.
  - *Possible Cause:* Unstable mounting or off-center load. *Solution:* Ensure the load cell is securely mounted and the load is applied centrally.
  - *Possible Cause:* Electrical noise. *Solution:* Use shielded cables, keep signal wires away from power lines, and ensure stable power supply to the ADC and microcontroller.
- **No Readings/Sensor Not Responding:**

- *Possible Cause:* Incorrect wiring. *Solution:* Double-check all wire connections against the diagram in Section 4.2.
- *Possible Cause:* Faulty ADC module or microcontroller. *Solution:* Test the ADC module and microcontroller with a known working setup if possible.
- *Possible Cause:* Damaged load cell. *Solution:* Inspect the load cell for physical damage. If damaged, replacement may be necessary.

- **Readings Drift Over Time:**
  - *Possible Cause:* Temperature fluctuations. *Solution:* Ensure the operating environment is stable. Some drift is inherent in strain gauges, but significant drift may indicate an issue.
  - *Possible Cause:* Creep. *Solution:* For long-term measurements, allow the sensor to stabilize under load before taking final readings.

8. Warranty and Support

No specific warranty information is provided for this product. For technical support or inquiries, please refer to the vendor or manufacturer's contact information available at the point of purchase.