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› DC 6-60V 400W BLDC Three Phase DC Brushless PWM Hall Electric Motor Controller Driver Board

Cywhrvzsf DC 60V

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INSTRUCTION MANUAL

1. Introduction

This manual provides comprehensive instructions for the installation, operation, and maintenance of the Cywhrvzsf DC 6-60V 400W BLDC Three Phase DC Brushless PWM Hall Electric Motor Controller Driver Board. This high-power controller is designed for DC brushless motors with a 120-degree electrical angle Hall sensor, offering robust performance with a maximum current rating of 16A (20A peak) and supporting both PLC 0-5V analog control and PWM control (amplitude 2.5-5V).

Key features include:

- Wide operating voltage range: 6-60V DC.
- High power output: Up to 400W.
- Flexible control options: Supports PLC 0-5V analog and PWM (2.5-5V amplitude).
- Comprehensive control interfaces: Direction (DIR), Stop (STOP), Brake (BRAKE), and Speed control signal input.
- Integrated Hall signal power supply input for seamless motor integration.

2. Safety Information

Adherence to safety guidelines is crucial for preventing damage to the device and ensuring user safety. Please read the following warnings carefully:

- **Hall Wire Identification:** If unsure about Hall wire definitions, always begin testing with low current and low voltage. Incorrect wiring, especially of power wires, can lead to permanent damage to the driver board. Adjust Hall wire sequence until normal operation is confirmed before applying high current and high voltage.
- **Wiring Insulation:** Ensure all wiring connections are properly insulated to prevent short circuits and electrical hazards.
- **Short Circuit Prevention:** Due to the module's high power and current capabilities, avoid short-circuiting any terminals when the module is not operating normally. This can cause severe damage.
- **Motor Compatibility:** This driver is exclusively designed for DC brushless motors equipped with a 120-degree electrical angle Hall sensor. Using it with incompatible motors may result in malfunction or damage.

3. Product Overview and Components

The Cywhrvzsf BLDC motor controller board features clearly labeled terminals for easy connection. Below are images illustrating the board and its primary connection points.

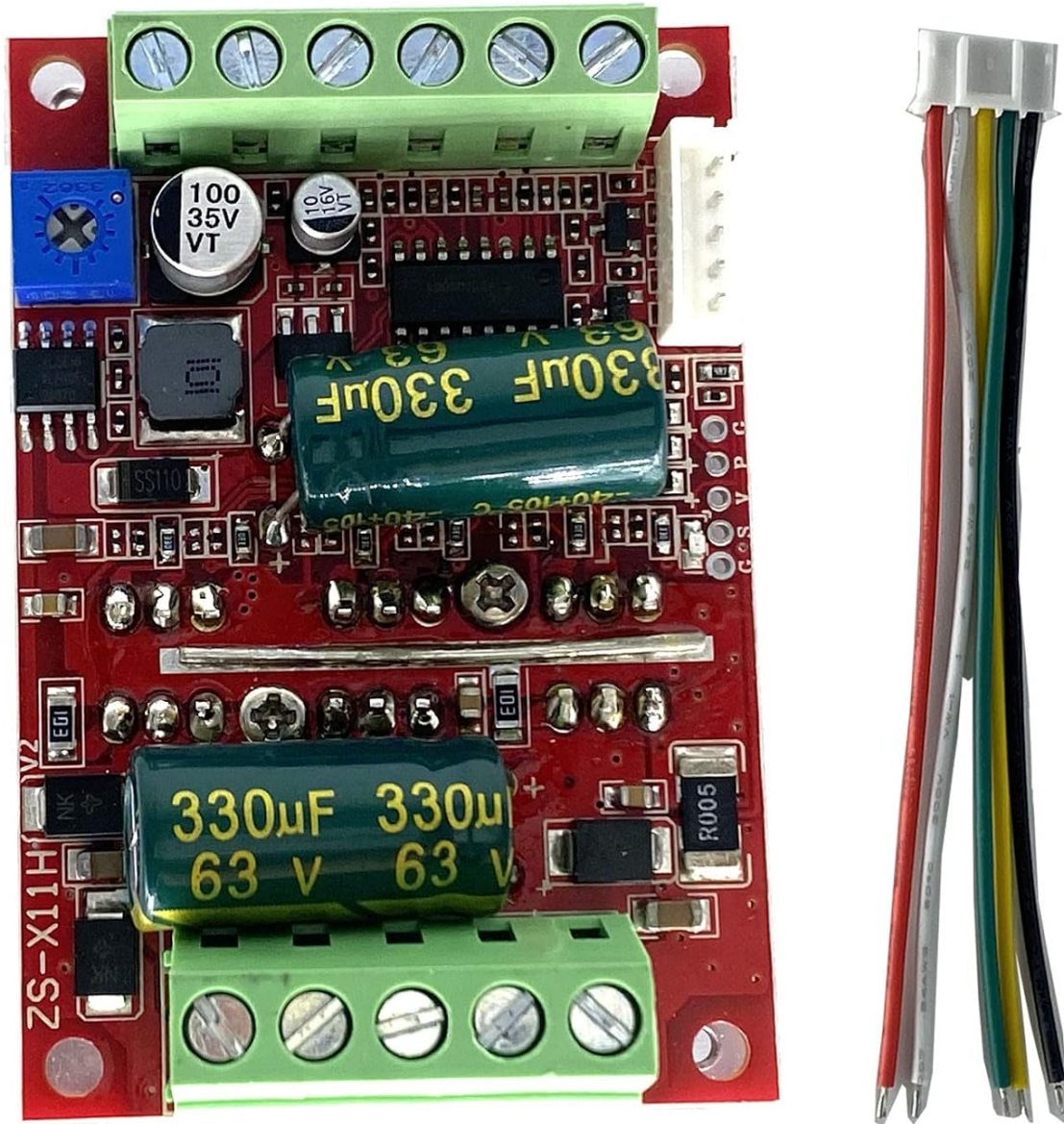


Figure 3.1: Overview of the DC 6-60V 400W BLDC Motor Controller Driver Board, showing the main board and the accompanying Hall sensor wires.

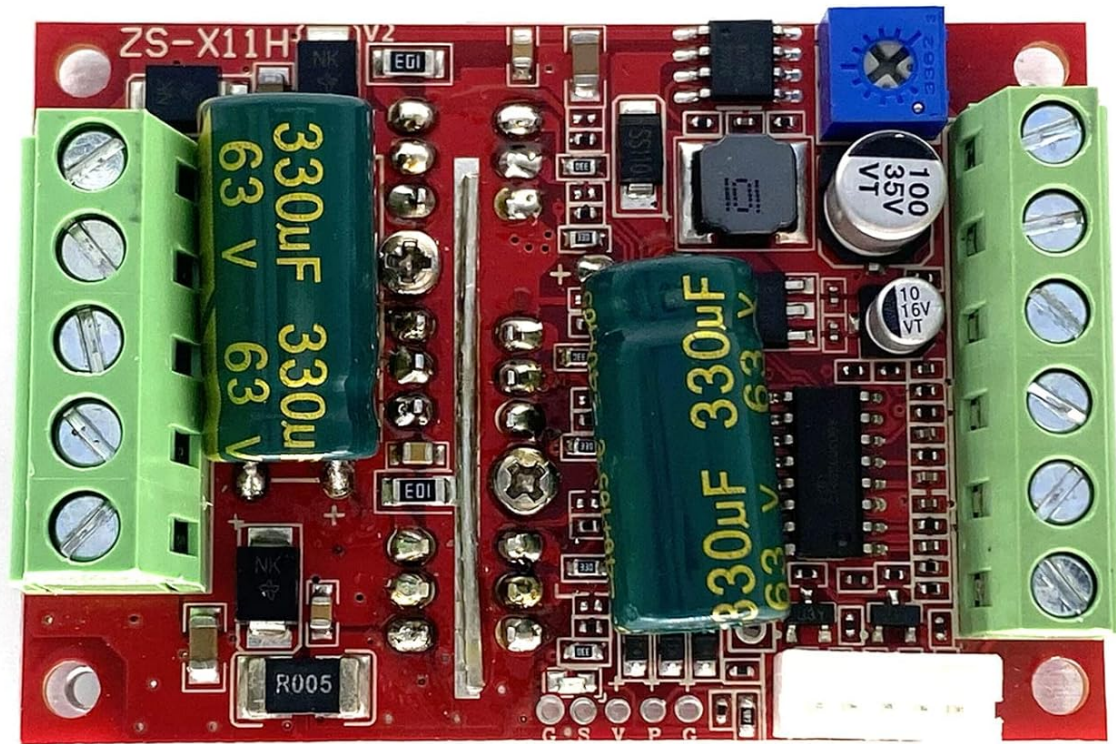


Figure 3.2: Top-down view of the controller board, highlighting the various components and terminal blocks.

Component Identification:

- **MA, MB, MC:** Three-phase output lines for connection to the motor.
- **VCC, GND (Main Power Supply):** Input terminals for the main DC power supply (6-60V).
- **5V, GND (On-board 5V):** Output terminals providing a stable 5V power supply from the motherboard.
- **SC:** Speed pulse signal output.
- **DIR:** Direction control interface (Forward/Reverse).
- **STOP:** Stop control interface.
- **BRAKE:** Brake control interface.
- **Speed Control Input:** Input for speed control signal (e.g., potentiometer, 0-5V analog, PWM).
- **Ha, Hb, Hc, +5V, GND (Hall Signal):** Input interface for Hall sensor signals from the motor. Motors with Hall sensors typically have 5 wires for these connections.
- **On-board Speed Control Potentiometer:** Used for manual speed adjustment.

4. Setup and Installation

Proper wiring is essential for the correct and safe operation of the motor controller. Follow these steps carefully.

4.1. Wiring Connections

Refer to the wiring diagrams below for connecting the motor, power supply, and control signals.

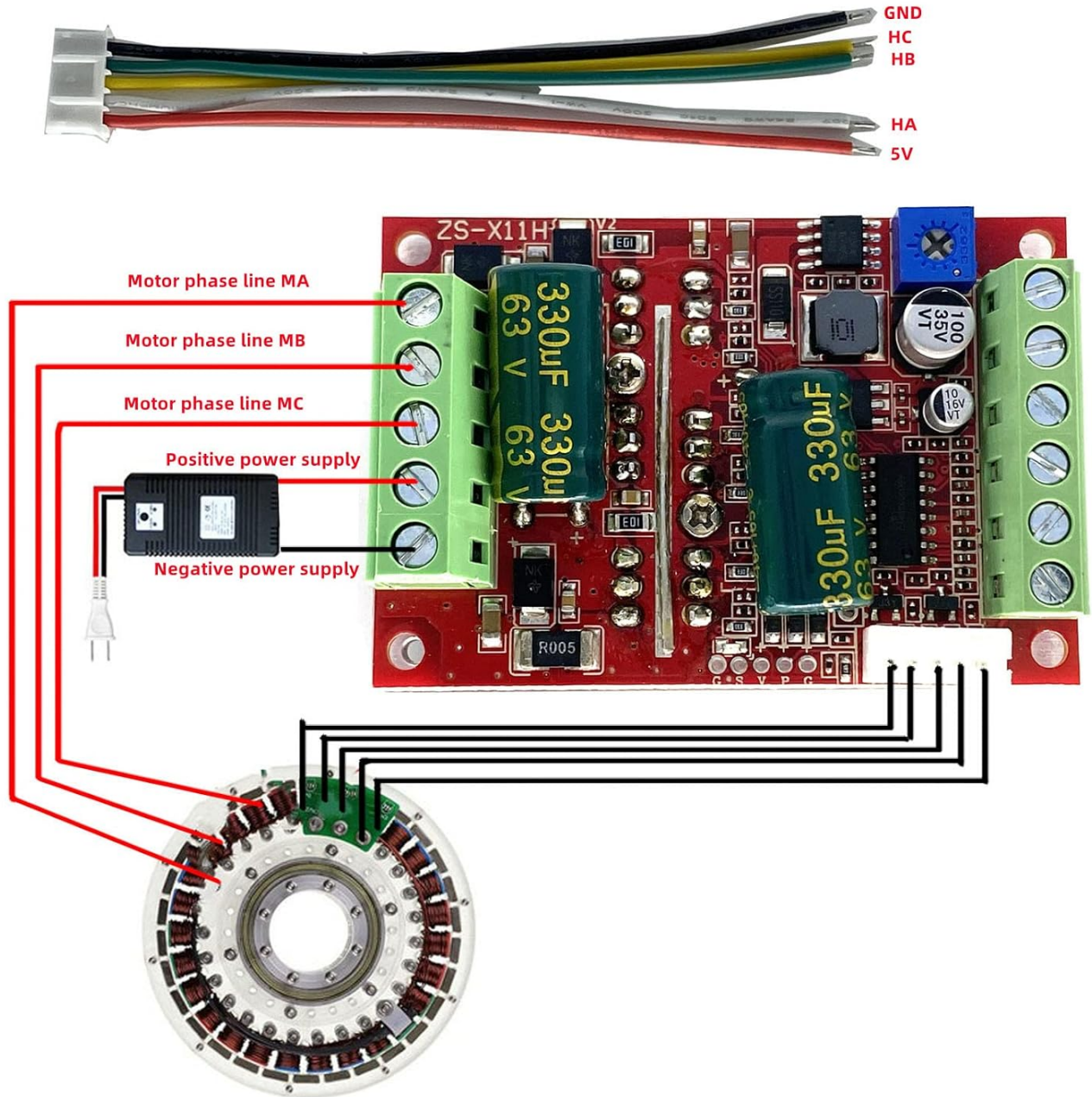


Figure 4.1: Basic wiring diagram illustrating connections for the motor phase lines (MA, MB, MC) and the main power supply (VCC, GND).

External 0-5V, the potentiometer on the analog input board needs to be adjusted to the minimum

Usually disconnected, short-circuit connected when the external PWM signal is input.

(Note: At this time, the blue speed control potentiometer on the board needs to be adjusted to the minimum)

On-board speed control potentiometer:

When controlled by PWM input or external potentiometer this potentiometer needs to be adjusted to the minimum (clockwise to increase, counter-clockwise to decrease)

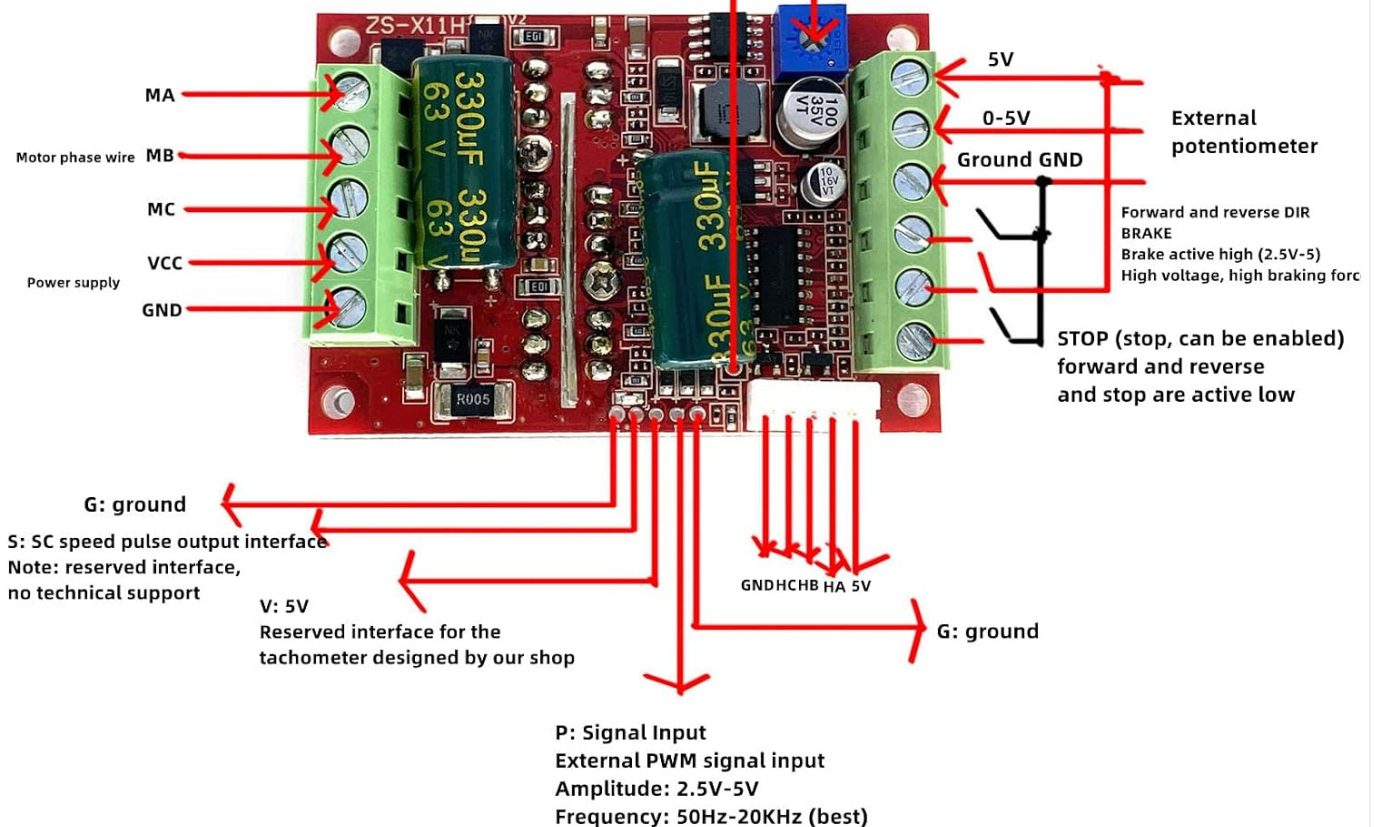


Figure 4.2: Detailed wiring diagram showing connections for Hall sensor wires (Ha, Hb, Hc, +5V, GND), external control signals (0-5V, PWM), and control interfaces (DIR, STOP, BRAKE).

- Motor Phase Lines:** Connect the three phase lines of your brushless motor to the MA, MB, and MC terminals on the driver board.
- Main Power Supply:** Connect your DC power supply (6-60V) to the VCC (positive) and GND (negative) terminals.
- Hall Sensor Wires:** Brushless motors with Hall sensors typically have 5 wires: two for Hall power (+5V, GND) and three for Hall signals (Ha, Hb, Hc).
 - Connect the Hall power wires to the +5V and GND terminals of the Hall signal input.
 - Connect the three Hall signal wires to the Ha, Hb, and Hc terminals.
 - Important:** The order of the three Hall signal wires must correspond correctly with the three-phase wires on the motor driver board for proper operation. If the motor does not run smoothly at low speeds or lacks torque, the Hall wire order may be incorrect.
- Control Signal Inputs:**
 - Speed Control:** For external 0-5V analog control or PWM control, connect the signal to the designated speed

control input. The on-board potentiometer should be adjusted to its minimum position when using external control.

- **Direction Control (DIR):** Connect to an external switch or signal source for forward and reverse operation. This interface is active low.
- **Stop Control (STOP):** Connect to an external switch or signal source to stop the motor. This interface is active low.
- **Brake Control (BRAKE):** Connect to an external switch or signal source for braking the motor. This interface is active low.
- **SC (Speed Pulse Signal Output):** This terminal provides a speed pulse signal.

4.2. Initial Testing (Hall Wire Definition)

If the Hall wire definitions of your motor are unknown, perform the following test to prevent damage:

1. Connect the motor and driver board using low current and low voltage for the initial test.
2. Carefully change the sequence of the three Hall signal wires (Ha, Hb, Hc) until the motor operates normally (smooth low-speed start, good torque).
3. Once the correct Hall wire sequence is confirmed, you may then apply high current and high voltage for full operation.

5. Operating Instructions

Once the controller is correctly wired and powered, you can control the motor's speed and direction.

5.1. Speed Control

- **On-board Potentiometer:** Rotate the blue potentiometer on the board to adjust the motor speed. Clockwise rotation increases speed, counter-clockwise decreases speed.
- **External 0-5V Analog Control:** Connect a 0-5V analog signal to the designated input. Ensure the on-board potentiometer is set to its minimum position when using external analog control.
- **PWM Control:** Connect a PWM signal (amplitude 2.5-5V, frequency 50Hz-20kHz recommended) to the designated input. The on-board potentiometer should be set to its minimum position.

5.2. Direction Control (DIR)

The DIR interface controls the motor's rotation direction. This is an active low interface. Applying a low signal (e.g., connecting to GND) will change the direction of rotation.

5.3. Stop and Brake Control

- **STOP:** The STOP interface is active low. Applying a low signal will halt the motor.
- **BRAKE:** The BRAKE interface is active low. Applying a low signal will engage the motor's brake function.

6. Maintenance

The BLDC motor controller is designed for durability, but proper maintenance ensures its longevity and reliable performance.

- **Cleanliness:** Keep the board free from dust, moisture, and conductive debris. Use a soft, dry brush or compressed air for cleaning.
- **Connection Integrity:** Periodically inspect all wiring connections to ensure they are secure and properly insulated. Loose connections can lead to intermittent operation or damage.
- **Environmental Conditions:** Operate the controller within its specified temperature and humidity ranges to prevent

component degradation.

- **Over-current Protection:** The motor output includes sampling over-current protection. While this feature helps protect the module, it is not a substitute for proper wiring and operation. Avoid conditions that consistently trigger over-current events.

7. Troubleshooting

If you encounter issues with the motor controller, consider the following troubleshooting steps:

Problem	Possible Cause	Solution
Motor does not run or runs erratically.	Incorrect Hall wire connection order.	Refer to Section 4.2. Perform low current/voltage testing and adjust Hall wire sequence until smooth operation is achieved.
Motor lacks torque or has rough low-speed start.	Incorrect Hall wire connection order.	Verify and correct the Hall wire sequence as described in Section 4.2.
Controller board is damaged or not functioning.	Short circuit during operation or wiring. Incompatible motor.	Ensure no short circuits occur. Verify motor is a DC brushless type with a 120-degree electrical angle Hall sensor. If damage persists, contact support.
Speed control not responding to external signal.	On-board potentiometer not set to minimum. Incorrect signal type/amplitude.	Ensure the on-board potentiometer is turned fully counter-clockwise (minimum). Verify external signal (0-5V analog or 2.5-5V PWM) is correct.

8. Specifications

Detailed technical specifications for the Cywhrvzsf BLDC Motor Controller Driver Board:

Parameter	Value
Model Number	DC 60V
Operating Voltage	6-60V DC
Maximum Power	400W
Rated Current	16A
Peak Current	20A
Control Type Supported	PLC 0-5V Analog Control, PWM Control
PWM Amplitude	2.5-5V
Compatible Motor Type	DC Brushless Hall Motor (120-degree electrical angle)
Material	Metal
Item Weight	0.08 Kilograms (approx. 2.89 ounces)
Package Dimensions	3.7 x 3.07 x 1.46 inches

9. Warranty and Support

For any issues or inquiries regarding your Cywhrvzsf BLDC Motor Controller Driver Board, please contact our customer support team.

We provide 24-hour online service. If you encounter any problems, please email [SELLER SUPPORT](#) (not Amazon support) for a prompt and effective solution.

Please refer to your purchase documentation for specific warranty terms and contact details for seller support.

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