

- Manuals.plus /
- › E-Motor Nations /
 - › MS-VFD11AMS23ANSAA Variable Frequency Drive User Manual

E-Motor Nations MS-VFD11AMS23ANSAA

MS-VFD11AMS23ANSAA Variable Frequency Drive User Manual

Model: MS-VFD11AMS23ANSAA
Brand: E-Motor Nations

1. PRODUCT OVERVIEW

The MS-VFD11AMS23ANSAA is a high-performance Variable Frequency Drive (VFD) from E-Motor Nations, designed for precise control of motor speed and torque. This model, part of the MS300 series, supports both Heavy Duty (HD) and Normal Duty (ND) applications, offering robust performance for various industrial needs. It is compatible with 3-phase 230VAC power systems and provides a wide frequency output range of 0-599.0Hz. Key features include V/Hz control, Sensorless Vector Control (SVC), and Permanent Magnet (PM) motor control capabilities, all within an IP20 rated, Frame C1 enclosure.



Figure 1: A range of MS300 series Variable Frequency Drives, showcasing different frame sizes and capacities available within the product line.

2. SAFETY INFORMATION

WARNING:

- Always read this user manual thoroughly before operating the VFD. Failure to do so may result in serious injury or equipment damage.
- **Risk of Electrical Shock:** This device operates with high voltage. To prevent electrical shock, wait at least 10 minutes after disconnecting all power sources before performing any servicing or inspection. Verify that all capacitors are discharged before touching any components.
- **Incorrect Wiring Hazard:** Do not connect AC power directly to the output terminals (U/T1, V/T2, and W/T3) of the VFD. These terminals are exclusively for connecting to the motor. Connecting AC power to these terminals will cause severe damage to the VFD.





Figure 2: Front panel of the MS-VFD11AMS23ANSAA VFD, showing the control interface and the prominent safety warning label at the bottom.

3. FEATURES

3.1 General Features

Table 1: General Features	
Category	Details
Control Methods	- Volt/Hertz, Sensorless Vector
Motor Compatibility	- Induction Motors (IM)
	- Interior Permanent Magnet Motors (IPM)
	- Surface Permanent Magnet Motors (SPM)
Ratings	- Heavy Duty and Normal Duty rated
Design	- Compact design saves 40% space compared to existing models
Voltage Options	- 115Vac 1-phase input, 230Vac 3-phase output (HD 1/4 ~ 1HP)
	- 230Vac 1-phase input, 230Vac 3-phase output (HD 1/4 ~ 3HP)
	- 230Vac 3-phase input, 230Vac 3-phase output (HD 1/4 ~ 20HP)
	- 460Vac 3-phase input, 460Vac 3-phase output (HD 1/4 ~ 30HP)
	- 575Vac 3-phase input, 575Vac 3-phase output (HD 1 ~ 10HP)
Programmable Speed	- 0 ~ 599Hz for high-speed applications
Starting Torque	- 200% High Starting Torque
	- Low-speed control: 0.5Hz (IM), 0.0Hz (PM)
Protection and Safety	- IP 20, IP21 with optional conduit box
	- Conformal coated circuit boards (IEC60721-3-3, class 3C2)
	- Adaptable to 50°C environment
	- RFI switch for IT mains
	- Power removal safety (Safe Torque Off) for Emergency Stop
Energy and Braking	- Deceleration Energy Back function
	- Built-in dynamic braking transistors

Figure 3: Table 1 - General Features of the MS300 series VFD, detailing control methods, motor compatibility, ratings, design, and voltage options.

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Programmable Speed	- 0 ~ 599Hz for high-speed applications
Starting Torque	- 200% High Starting Torque - Low-speed control: 0.5Hz (IM), 0.0Hz (PM)
Protection and Safety	- IP 20, IP21 with optional conduit box - Conformal coated circuit boards (IEC60721-3-3, class 3C2) - Adaptable to 50°C environment - RFI switch for IT mains - Power removal safety (Safe Torque Off) for Emergency Stop
Energy and Braking	- Deceleration Energy Back function - Built-in dynamic braking transistors

3.2 Advanced Features and Connectivity

Table 2: Advanced Features and Connectivity	
Category	Details
Application Macros	- Compressor, Fan, Pump, Conveyor, Packaging, Textiles, Machine Tool
Built-In Functions	- Realtime clock & calendar
	- Built-in 2K step capacity PLC
	- Adjustable output current (up to 120% of drive's nominal capacity)
Quick Setup and Connections	- Quick connect spring set control terminals
Inputs	- 9 Digital Inputs (2 dedicated STO, 7 programmable, NPN/PNP configurable)
	- 2 Analog Inputs (0 ~ 10V, -10 ~ +10V, 0 ~ 20mA, 4 ~ 20mA, PTC thermistor, RTD PT100)
Outputs	- 1 Digital Output (dry contact: 1 NO, 1 NC)
	- 2 Open collector transistors
	- 1 Digital frequency output
	- 1 Analog Output (programmable, 0 ~ 10V, 0 ~ 20mA, 4 ~ 20mA)
Communication	- Channel 1 USB
	- Channel 2 RS-485 (RJ-45, SG+, SG-, SGND terminals)
	- Resident Protocols: Modbus RTU & ASCII
	- Optional Protocols: Profibus DP, DeviceNet, Modbus TCP, Ethernet/IP, CANopen
	- 1 Option card slot (for communication cards)

Figure 4: Table 2 - Advanced Features and Connectivity of the MS300 series VFD, detailing application macros, built-in functions, quick setup, inputs, outputs, and communication options.

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Application Macros	- Compressor, Fan, Pump, Conveyor, Packaging, Textiles, Machine Tool
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Inputs	- 9 Digital Inputs (2 dedicated STO, 7 programmable, NPN/PNP configurable) - 2 Analog Inputs (0 ~ 10V, -10 ~ +10V, 0 ~ 20mA, 4 ~ 20mA, PTC thermistor, RTD PT100)

Category	Details
Outputs	- 1 Digital Output (dry contact: 1 NO, 1 NC) - 2 Open collector transistors - 1 Digital frequency output - 1 Analog Output (programmable, 0 ~ 10V, 0 ~ 20mA, 4 ~ 20mA)
Communication	- Channel 1 USB - Channel 2 RS-485 (RJ-45, SG+, SG-, SGND terminals) - Resident Protocols: Modbus RTU & ASCII - Optional Protocols: Profibus DP, DeviceNet, Modbus TCP, Ethernet/IP, CANopen - 1 Option card slot (for communication cards)

4. SPECIFICATIONS

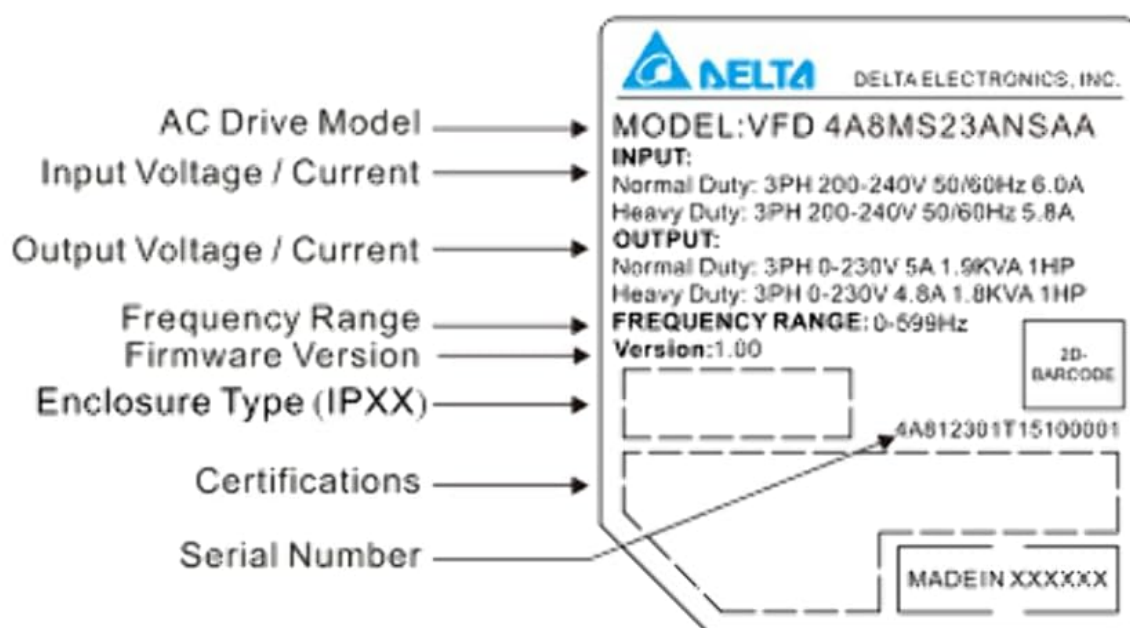
4.1 General Product Specifications

Specification	Value
Package Dimensions	6.18 x 5.98 x 3.43 inches
Item Weight	2.73 pounds (1238 Grams)
Manufacturer	E-Motor Nations
ASIN	B0DV8XCKHG
Batteries required	No
Brand	E-Motor Nations
UPC	734690197695

4.2 Nameplate Information

The product nameplate provides critical information about the specific model, input/output ratings, and certifications. Understanding the nameplate is essential for proper installation and operation.

Nameplate Information



Model Name

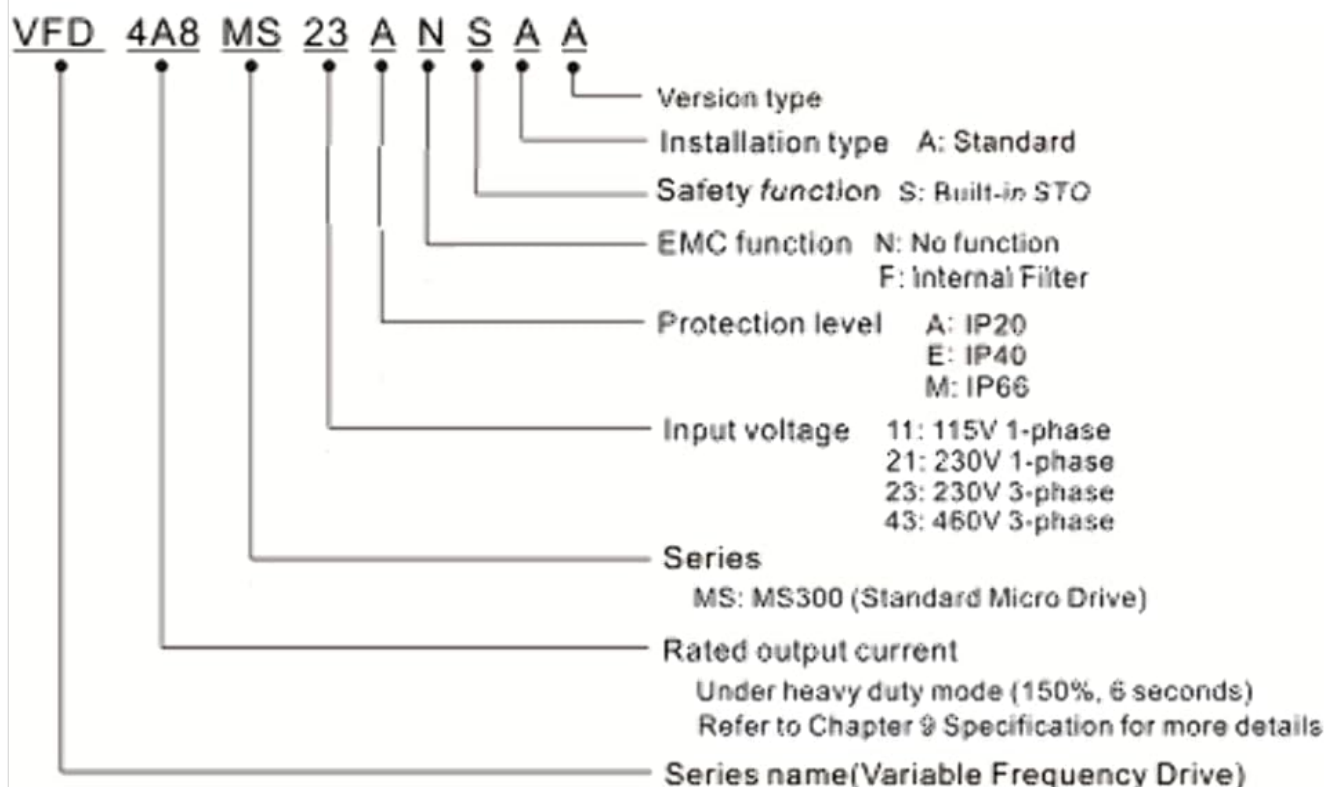


Figure 5: Detailed breakdown of the VFD nameplate, illustrating the location of AC Drive Model, Input Voltage/Current, Output Voltage/Current, Frequency Range, Firmware Version, Enclosure Type, Certifications, and Serial Number. Below, a diagram explains the MS300 model naming convention, including series, input voltage, protection level, EMC function, safety function, installation type, and version type.

4.3 Frame Dimensions (Frame C1)

The MS-VFD11AMS23ANSAA model belongs to Frame C1. The following diagram and table provide the precise dimensions for installation planning. All dimensions are in millimeters [inches].

Frame C

C1: VFD4A8MS11ANSAA; VFD4A8MS11ENSAA; VFD7A5MS21ANSAA; VFD7A5MS21ENSAA;
VFD11AMS21ANSAA; VFD11AMS21ENSAA; VFD11AMS23ANSAA; VFD11AMS23ENSAA;
VFD17AMS23ANSAA; VFD17AMS23ENSAA; VFD5A5MS43ANSAA; VFD5A5MS43ENSAA;
VFD9A0MS43ANSAA; VFD9A0MS43ENSAA

C2: VFD7A5MS21AFSAA; VFD11AMS21AFSAA; VFD5A5MS43AFSAA; VFD9A0MS43AFSAA

Unit: mm [inch]

Frame	W	H	D	W1	H1	D1	S1
C1	87.0 [3.43]	157.0 [6.18]	152.0 [5.98]	73.0 [2.87]	144.5 [5.69]	5.0 [0.20]	5.5 [0.22]
C2	87.0 [3.43]	157.0 [6.18]	179.0 [7.05]	73.0 [2.87]	144.5 [5.69]	5.0 [0.20]	5.5 [0.22]

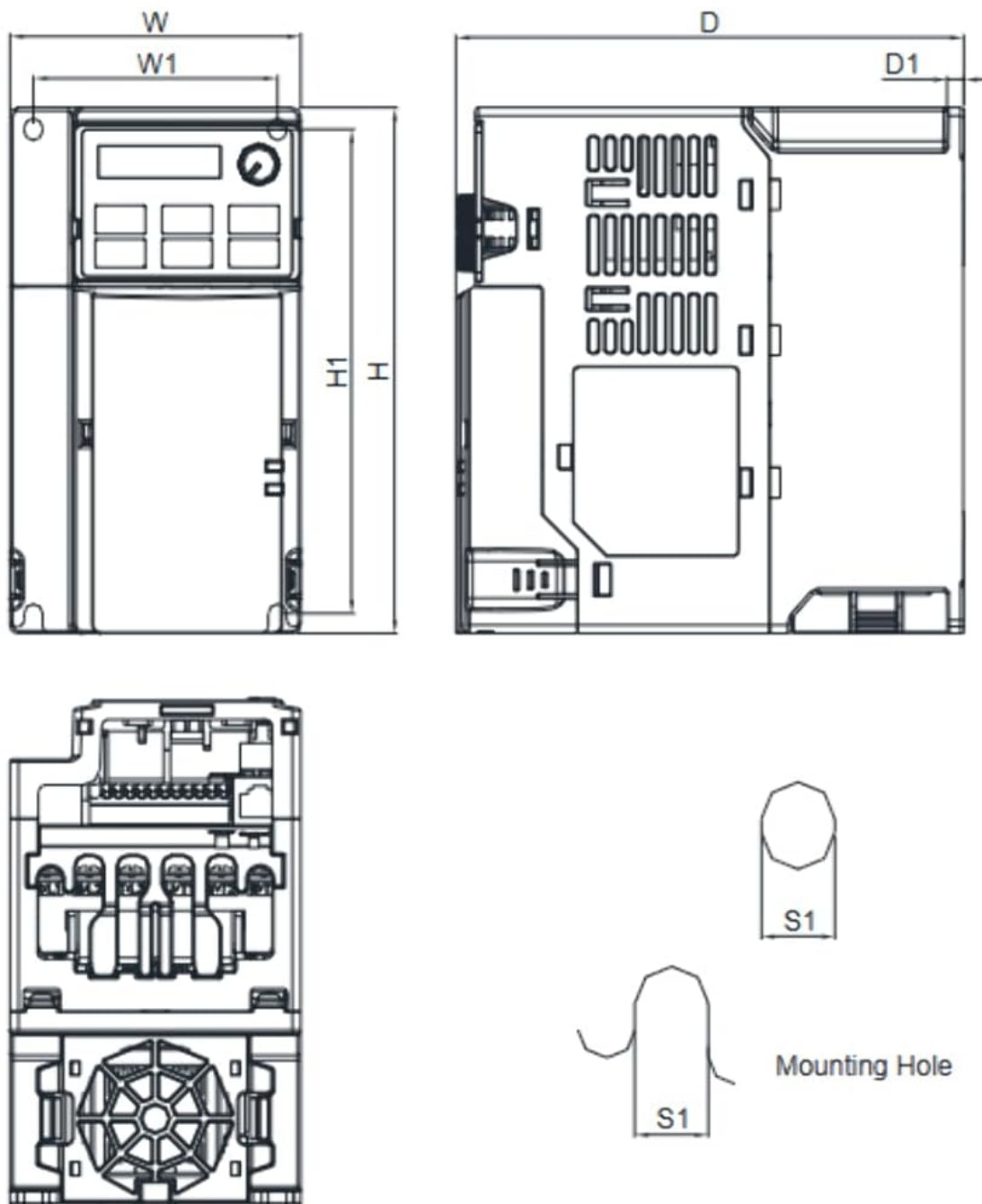


Figure 6: Technical drawing showing the front, side, and bottom views of the Frame C1 VFD, along with a table providing detailed measurements (W, H, D, W1, H1, D1, S1) in millimeters and inches. This includes mounting hole dimensions.

Table 3: Frame C1 Dimensions (Unit: mm [inch])

Frame	W	H	D	W1	H1	D1	S1
C1	87.0 [3.43]	157.0 [6.18]	152.0 [5.98]	73.0 [2.87]	144.5 [5.69]	5.0 [0.20]	5.5 [0.22]

Frame	W	H	D	W1	H1	D1	S1
C2	87.0 [3.43]	157.0 [6.18]	179.0 [7.05]	73.0 [2.87]	144.5 [5.69]	5.0 [0.20]	5.5 [0.22]

5. SETUP AND INSTALLATION

Proper installation is crucial for the safe and efficient operation of the VFD. Ensure all power is disconnected before beginning any wiring.

5.1 Wiring Connections

The VFD requires connections for input power, motor output, and control signals. Refer to the internal wiring diagram for precise terminal identification.

- **Input Power (R/L1, S/L2, T/L3):** Connect the 3-phase 230VAC power supply to these terminals. Ensure proper grounding.
- **Motor Output (U/T1, V/T2, W/T3):** Connect these terminals directly to the motor windings. Do not connect AC power here.
- **Control Terminals:** Utilize the quick-connect spring set control terminals for digital inputs, analog inputs, and output relays as per your application requirements. These include dedicated Safe Torque Off (STO) inputs.
- **Communication Ports:** The VFD features a built-in USB port (Channel 1) for easy parameter editing, copying, uploading, and downloading using Delta VFDSOft software. An RS-485 port (Channel 2) is also available for Modbus RTU/ASCII communication.



Figure 7: An internal view of the VFD, illustrating the layout of the wiring terminals and prominently highlighting the built-in USB port for configuration and data transfer. This port allows for easy connection to a computer for parameter management.

5.2 Mounting

Mount the VFD vertically on a flat, stable surface, ensuring adequate ventilation space around the unit for heat dissipation. Refer to the dimensions in Section 4.3 for proper clearance.

6. OPERATION

The VFD is operated via the integrated control panel. Familiarize yourself with the buttons and display before starting the motor.

6.1 Control Panel Overview

- **RUN Button:** Initiates motor operation.
- **STOP/RESET Button:** Stops motor operation and clears any active fault codes.
- **MODE Button:** Toggles between different display modes and parameter groups.
- **ENTER Button:** Confirms parameter settings or enters sub-menus.
- **Up/Down Arrows (▲ / ▼):** Used to navigate through parameters or adjust values.
- **Left/Right Arrows (< / >):** Used to shift digits when entering numerical values or navigate between parameter digits.

6.2 Basic Operation Steps

1. **Power On:** Apply 3-phase 230VAC power to the VFD. The display will illuminate.
2. **Parameter Setting:** Use the MODE and arrow buttons to navigate to the desired parameter group (e.g., frequency setting, acceleration/deceleration times). Use ENTER to select, adjust values with Up/Down, and confirm with ENTER. Refer to the detailed parameter manual for specific settings.
3. **Start Motor:** Press the **RUN** button. The motor will accelerate to the set frequency.
4. **Stop Motor:** Press the **STOP/RESET** button. The motor will decelerate and stop.

7. MAINTENANCE

Regular maintenance ensures the longevity and reliable operation of your VFD.

- **Cleaning:** Periodically clean the VFD's exterior and ventilation openings to prevent dust accumulation, which can impede cooling. Use a soft, dry cloth. Do not use liquid cleaners.
- **Inspection:** Regularly inspect all wiring connections for tightness and signs of wear or damage. Check for any unusual noises or odors during operation.
- **Ventilation:** Ensure that the VFD's cooling fans are operating correctly and that airflow is not obstructed. Maintain adequate clearance around the unit as specified in the installation section.
- **Capacitor Life:** Electrolytic capacitors have a finite lifespan. While designed for long life, consider professional inspection or replacement after several years of continuous operation, especially in high-temperature environments.

8. TROUBLESHOOTING

This section provides basic troubleshooting steps for common issues. For complex problems or persistent faults, contact technical support.

Problem	Possible Cause	Solution
VFD does not power on	No input power; Blown fuse; Internal fault	Check input power supply and fuses. Ensure connections are secure. If problem persists, contact support.

Problem	Possible Cause	Solution
Motor does not run	VFD in STOP mode; Fault code active; Incorrect parameter settings; Motor wiring issue	Press RUN button. Check display for fault codes and refer to manual for specific code solutions. Verify motor wiring and parameter settings (e.g., frequency command, run command source).
Overcurrent fault (OC)	Motor overload; Short circuit in motor wiring; Rapid acceleration/deceleration; Incorrect motor parameters	Check motor load. Inspect motor wiring for shorts. Adjust acceleration/deceleration times. Verify motor parameters (e.g., motor rated current, auto-tuning).
Overvoltage fault (OV)	Rapid deceleration; High input voltage; Regenerative load	Increase deceleration time. Check input voltage. Consider adding an external braking resistor if regenerative load is present.
Overheat fault (OH)	Insufficient ventilation; Ambient temperature too high; Cooling fan failure	Ensure adequate airflow around VFD. Reduce ambient temperature if possible. Check cooling fan operation. Clean heatsink.

Always refer to the complete VFD manual for a comprehensive list of fault codes and detailed troubleshooting procedures.

9. WARRANTY AND SUPPORT

For warranty information, technical support, or service inquiries regarding your MS-VFD11AMS23ANSAA VFD, please contact E-Motor Nations directly or your authorized distributor. Ensure you have your product model number (MS-VFD11AMS23ANSAA) and serial number ready when contacting support.

Manufacturer: E-Motor Nations

Please visit the official E-Motor Nations website or refer to your purchase documentation for the most current contact information and warranty terms.

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