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## Walfront SX440

# Walfront SX440 Automatic Voltage Regulator User Manual

Model: SX440

## 1. PRODUCT OVERVIEW

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The Walfront SX440 is a half-phase-controlled thyristor type Automatic Voltage Regulator (AVR) designed for brushless generators. It functions as a critical component of the generator's excitation system, ensuring stable voltage output.

This AVR not only regulates the generator voltage but also incorporates essential safety features such as under-speed protection and sensing loss detection to maintain reliable control of the generator.

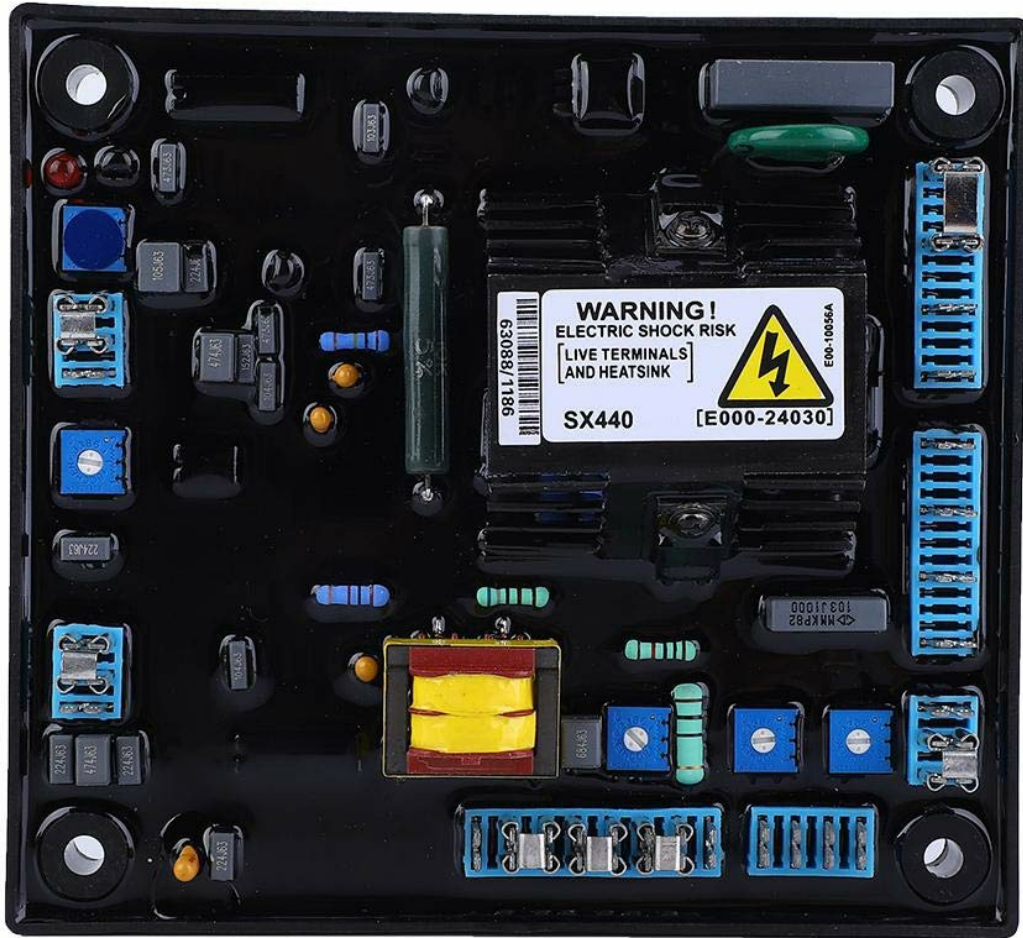


Image 1.1: Top view of the Walfront SX440 Automatic Voltage Regulator circuit board.

## 2. SAFETY INFORMATION

### **WARNING! ELECTRIC SHOCK RISK!**

This device operates with high voltages. Improper installation or handling can result in severe injury or death. Always observe the following safety precautions:

- Installation and maintenance must only be performed by qualified and experienced personnel.
- Ensure the generator is completely shut down and disconnected from all power sources before attempting any installation, inspection, or maintenance.
- Do not touch live terminals or heatsinks when the unit is powered.
- Always use appropriate personal protective equipment (PPE), including insulated gloves and safety glasses.
- Verify all wiring connections are secure and correct according to the generator manufacturer's specifications.

## 3. PRODUCT FEATURES

The SX440 AVR incorporates advanced design and functionality for reliable generator performance:

- **Automatic Voltage Regulation:** Maintains a stable output voltage from the generator.
- **Under-Speed Protection:** Prevents damage to the generator by reducing output voltage when engine speed drops below a preset threshold.
- **Sensing Loss Protection:** Safeguards the generator in case of voltage sensing circuit failure.
- **Surface Mount Technology (SMT):** Utilizes SMT for high integration, resulting in a compact and robust AVR design.
- **Efficient Power Circuitry:** Employs proficient semiconductors for reliable positive voltage build-up.
- **Flexible Excitation Power:** Control and voltage sensing circuits have separate terminals, allowing excitation power to be sourced directly from the stator winding or an auxiliary winding for sustained short-circuit performance.



Image 3.1: Angled view of the SX440 AVR, highlighting its compact design and various connection points.

## 4. SPECIFICATIONS

Parameter	Value
Model	SX440
Detection and Power Input Voltage	190-264VAC, Single Phase Two Line
Magnetic Field Output	Maximum 100VDC at input voltage 207VAC

Parameter	Value
Continuous Current	8A
Non-Continuous Current	10A within 10 seconds
Voltage Regulation Accuracy	±1% RMS (engine speed variation within 4%)
System Requirements	Brushless generator within 500KW
Item Weight	500 g

## 5. SETUP AND INSTALLATION

Installation of the SX440 AVR should only be performed by a qualified electrician or generator technician. Refer to your generator's specific wiring diagrams and safety guidelines in conjunction with these instructions.

### 5.1 Mounting

- Mount the AVR in a location free from excessive vibration, moisture, and extreme temperatures.
- Ensure adequate ventilation around the unit to prevent overheating.
- Use appropriate fasteners to secure the AVR firmly.

### 5.2 Wiring Connections

The SX440 features separate terminals for control and voltage sensing circuits. Consult your generator's manual for specific connection points for the AVR.

- **Power Input:** Connect the 190-264VAC single-phase two-line power input to the designated terminals on the AVR.
- **Excitation Output:** Connect the AVR's magnetic field output terminals to the generator's exciter field windings.
- **Voltage Sensing:** Connect the voltage sensing terminals to the generator's output terminals to allow the AVR to monitor and regulate the voltage.
- **Auxiliary Connections:** If applicable, connect any auxiliary windings or remote voltage adjustment devices according to your generator's specifications.

**Important: Double-check all wiring for correct polarity and secure connections before applying power. Incorrect wiring can damage the AVR or the generator.**



Image 5.1: Close-up view of the SX440 AVR, detailing the terminal blocks for wiring connections and adjustment potentiometers.

## 6. OPERATING INSTRUCTIONS

Once the SX440 AVR is correctly installed and wired, its operation is largely automatic. The AVR continuously monitors the generator's output voltage and adjusts the excitation current to maintain the desired voltage level.

### 6.1 Initial Start-up

- Before starting the generator, ensure all connections to the AVR are secure and correct.
- Start the generator according to its manufacturer's instructions.
- The AVR will automatically begin to build up voltage. Monitor the generator's output voltage to ensure it stabilizes at the rated level.

### 6.2 Voltage Adjustment

The SX440 AVR typically includes potentiometers for fine-tuning voltage output and stability. These adjustments should only be made by qualified personnel using appropriate measuring equipment.

- **Voltage Adjustment:** Use the designated potentiometer to set the desired output voltage.
- **Stability Adjustment:** Adjust the stability potentiometer to prevent voltage oscillations or hunting.
- **Under-Speed Adjustment:** If present, this potentiometer sets the frequency threshold at which under-speed protection activates.

**Caution: Incorrect adjustment of these settings can lead to unstable generator operation or damage to connected equipment.**

## 7. MAINTENANCE

The Walfront SX440 AVR is designed for long-term reliability with minimal maintenance. However, periodic inspection is recommended to ensure optimal performance and longevity.

- **Visual Inspection:** Periodically inspect the AVR for any signs of physical damage, loose connections, or discoloration due to overheating.
- **Cleanliness:** Keep the AVR free from dust, dirt, and moisture. Use a soft, dry brush or compressed air to gently clean the circuit board if necessary. Ensure power is disconnected before cleaning.
- **Connection Checks:** Verify that all wiring connections remain tight and free from corrosion.

**Note: Do not attempt to repair the AVR yourself. If the unit is faulty, it should be replaced by a new one or serviced by an authorized technician.**

## 8. TROUBLESHOOTING

This section provides guidance for common issues that may arise with the SX440 AVR. For complex problems, consult a qualified technician.

Problem	Possible Cause	Solution
No voltage output from generator	<ul style="list-style-type: none"><li>• Incorrect wiring</li><li>• No input power to AVR</li><li>• Faulty AVR</li><li>• Generator exciter fault</li></ul>	<ul style="list-style-type: none"><li>• Verify all wiring connections are correct and secure.</li><li>• Check for proper 190-264VAC input to the AVR.</li><li>• Test the AVR (if possible, by a qualified technician).</li><li>• Inspect generator exciter windings.</li></ul>
Unstable or fluctuating voltage	<ul style="list-style-type: none"><li>• Incorrect stability adjustment</li><li>• Loose connections</li><li>• Generator engine speed instability</li><li>• Overload condition</li></ul>	<ul style="list-style-type: none"><li>• Adjust the stability potentiometer on the AVR.</li><li>• Check all wiring connections for tightness.</li><li>• Ensure generator engine speed is stable.</li><li>• Reduce load on the generator.</li></ul>
Over-voltage or Under-voltage	<ul style="list-style-type: none"><li>• Incorrect voltage adjustment</li><li>• Sensing circuit fault</li></ul>	<ul style="list-style-type: none"><li>• Adjust the voltage potentiometer on the AVR.</li><li>• Check voltage sensing connections and wiring.</li></ul>

## 9. WARRANTY AND SUPPORT

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For specific warranty information regarding your Walfront SX440 Automatic Voltage Regulator, please refer to the documentation provided at the time of purchase or contact your seller directly. Warranty terms may vary based on region and retailer.

For technical support, product inquiries, or assistance with troubleshooting beyond the scope of this manual, please contact Walfront customer service through their official channels or your product supplier.

**Walfront Contact Information:** Please refer to the Walfront official website or your purchase documentation for the most current contact details.