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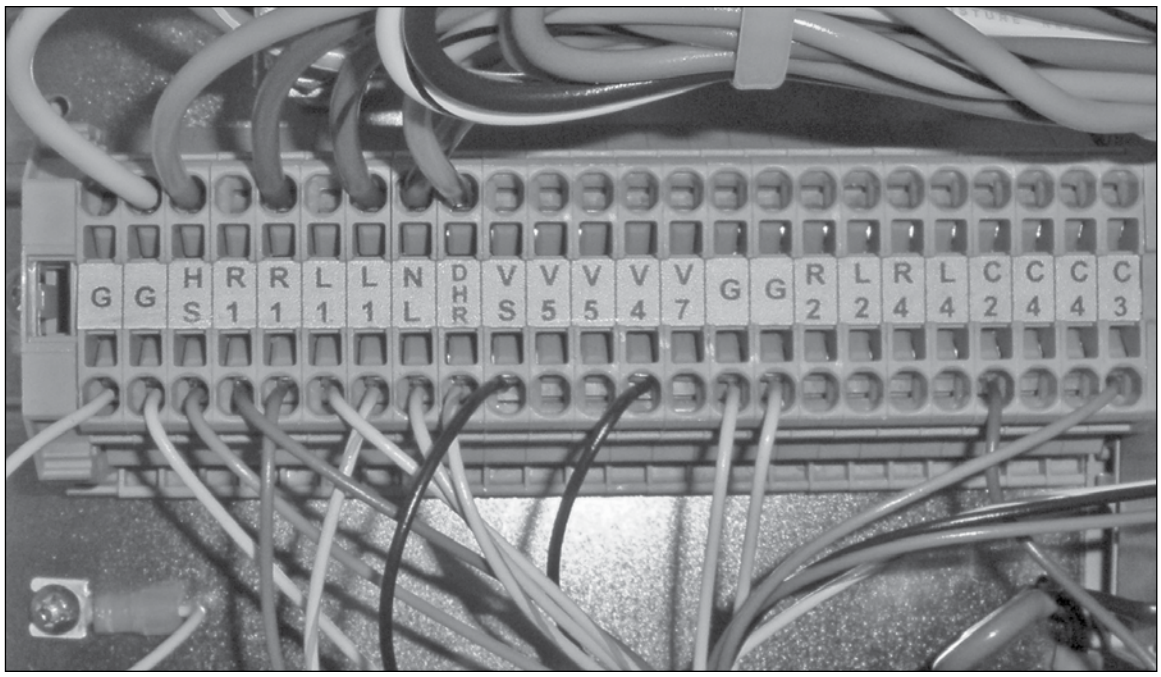
Testing a motor capacitor on a voltage regulator procedure instructions



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Contents

Safety for life

Eaton's Cooper Power series products meet or exceed all applicable industry standards relating to product safety. We actively promote safe practices in the use and maintenance of our products through our service literature, instructional training programs, and the continuous efforts of all Eaton employees involved in product design, manufacture, marketing and service.

We strongly urge that you always follow all locally approved safety procedures and safety instructions when working around high-voltage lines and equipment and support our "Safety For Life" mission.

Safety information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians, who are familiar with this equipment should install, operate and service it.

A competent technician has these qualifications:

- Is thoroughly familiar with these instructions.
- Is trained in industry-accepted high- and low-voltage safe operating practices and procedures.
- Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
- Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, clampstick, hotstick, etc.

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statement Definitions

This manual may contain four types of hazard statements:

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in equipment damage only.

Safety instructions

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

DANGER

Hazardous voltage. Contact with high voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high- and low-voltage lines and equipment.

WARNING

Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.

WARNING

This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply may result in death, severe personal injury and equipment damage.

WARNING

Power distribution and transmission equipment must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install or maintain power distribution and transmission equipment can result in death, severe personal injury, and equipment damage.

Product Information

Introduction

Service Information MN225064EN provides instruction for testing a motor capacitor on a voltage regulator.

Refer to MN225003EN, CL-7 voltage regulator control installation, operation, and maintenance instructions and MN225008EN, VR-32 Voltage Regulator with Quik-Drive Tap-Changer Installation, Operation and Maintenance Instructions for detailed service information on Eaton's Cooper Power series voltage regulators and controls.

⚠ Read this manual first

Read and understand the contents of this manual and follow all locally approved procedures and safety practices before installing or operating this equipment.

Additional Information

These instructions cannot cover all details or variations in the equipment, procedures, or processes described nor provide directions for meeting every possible contingency during installation, operation, or maintenance. For additional information, contact your Eaton Cooper Power series product representative.

Standards

ISO 9001 Certified Quality Management System

⚠ CAUTION

Electrical Shock Hazard. Contact with terminals on the backpanel may expose the tester to 120 VAC resulting in an electrical shock.

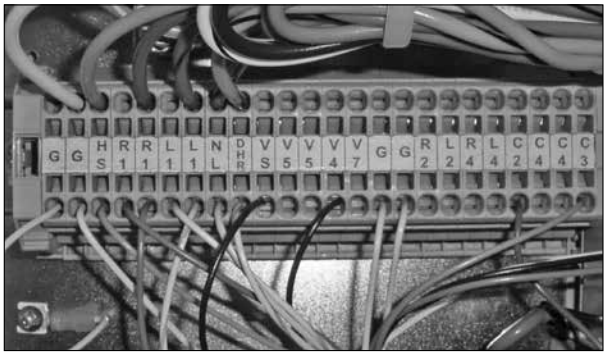

Figure 1. Standard dead-front back panel, TB1 located at top of control box.

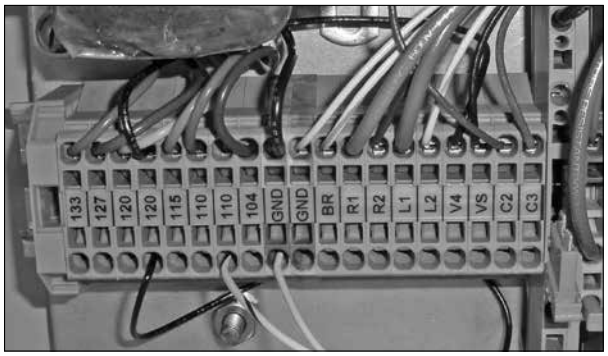

Figure 2. Alternate short back panel, TB3 located at bottom of control box.

Procedure description

If the motor capacitor is located in the control box, it can be removed from the circuit and tested using a voltmeter with a capacitance setting. The procedure described here is for testing a motor capacitor that is located in the tank and not accessible.

Procedure instructions

1. The motor capacitor can be checked using either internal or external power.
2. Connect a voltmeter between TB1-R1 (TB3-R1 on the alternate short back-panel) and Ground.
3. Toggle the Control Function switch to Manual.
4. Using the Raise/Lower switch, give the tap-changer a Raise signal while observing the voltmeter. The voltmeter should read approximately 120 volts.
5. Connect the voltmeter between TB1-L1 (TB3-L1 on the alternate short back-panel) and Ground.
6. Using the Raise/Lower switch, give the tap-changer a Raise signal while observing the voltmeter. The voltmeter should read approximately 120 volts plus the capacitive voltage and should be between 160 and 190 volts. If the voltmeter reads zero volts or millivolts, the capacitor has failed open.
7. To recheck the results, connect the voltmeter between TB1-L1 (TB3-L1 on the alternate short back-panel) and Ground.
8. With the Control Function switch on Manual, give the tap-changer a Lower command using the Raise/Lower switch while observing the voltmeter. The voltmeter should read approximately 120 volts.
9. Connect the voltmeter between TB1-R1 (TB3-R1 on the alternate short back-panel) and Ground.
10. Using the Raise/Lower switch, give the tap-changer a Lower signal while observing the voltmeter. The voltmeter should read approximately 120 volts plus the capacitive voltage and should be between 160 and 190 volts. If the voltmeter reads zero volts or millivolts, the capacitor has failed open.

11. If a voltage is present between R1 and Ground or L1 and Ground that is more than millivolts without giving a raise or lower signal, either the capacitor or motor has failed shorted or there is some other type of short or wiring problem. If a cause cannot be found in the control panel or back panel, an outage is required to remove the voltage regulator from service.
12. If the motor capacitor has failed open and is located inside the tank, it can be temporarily replaced using the instruction found in the document MN225063EN, *External application of a motor start capacitor on a single-phase voltage regulator.*

Contact your Eaton Cooper Power series product representative to request further assistance.

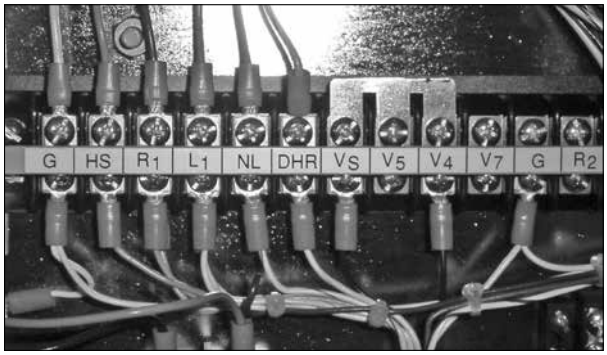

Figure 3. Legacy back panel, TB1 located at top of control box.

Figure 4. Control panel switches.

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