Voltage Regulators

COOPER Power Systems

Service Information

Auto-Booster Regulator Control Description and Operational Instructions

S225-20-2

Contents

PRODUCT INFORMATION

Introduction

The Auto-Booster Regulator Control is designed to provide an operator's interface for controlling and setting parameters for the Auto-Booster. Inside a weatherproof enclosure, the solid-state electronic control has settings and voltage metering available by accessing push button switches on the front panel. The control has an adjustable bandwidth setting accessible at the front panel; having unique controls available for different bandwidths has been eliminated. An added feature of the control is a time delay with numerous selections that add to the inherent time delay of the tap changer. This feature is accessible on the printed circuit board behind the front panel by way of a dipswitch.

The control also features a neutral-position-indicating LED that lights simultaneously with the LED on the auto-booster tank wall. This neutral LED provides an important check of the neutral position when installing or removing the auto-booster from the system.

Surge suppressors located inside on the back of the enclosure in conjunction with a ground connection made to the back of the box will provide the ultimate transient surge protection of the control. A ground connector is provided for the convenience of the user. Control must be grounded for surge suppressor circuity to be effective.

⚠ 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 representative.

Acceptance and Initial Inspection

Each Auto-Booster regulator control is in good condition when accepted by the carrier for shipment. Upon receipt, inspect the shipping container for signs of damage. Unpack the Auto-Booster regulator control and inspect it thoroughly for damage incurred during shipment. If damaged is discovered, file a claim with the carrier immediately.

Handling and Storage

Be careful during handling and storage of the Auto-Booster regulator control to minimize the possibility of damage. If the Auto-Booster regulator control is to be stored for any length of time prior to installation, provide a clean, dry storage area.

Standards

ISO 9001:2008 Certified Quality Management System

Figure 1.
Auto-Booster Regulator Control.

SAFETY FOR LIFE

Cooper Power Systems 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 Cooper Power Systems 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, 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.

OPERATIONAL INSTRUCTIONS

Field Replacements

Two basic types of the Auto-Booster controls are available for field replacement. The standard control has a neutral light providing an important double check of the neutral position in conjunction with the existing neutral light on the tank wall. The Auto-Booster must be in the neutral position when installing or removing it from service. Some older models of the Auto-Booster do not have the circuitry available for activating this neutral light on the control. A special control is available for handling these types of older models. The surge protection circuit inside on the back of the enclosure is modified to handle the older circuitry and the neutral light of the control is masked. Kits are available for upgrading the obsolete tap changers and circuitry to incorporate the standard Auto-Booster control with a neutral light.

The standard control with neutral light, 57A64306600A, replaces 37C14214500A (AA003), 37C14214500C (AA005), 37C14214500E (AA006) and 37C14214500G (AA004). The special control without neutral light, 57A64306600B, replaces 37C14214500B (AA013), 37C14214500D (AA015), 37C14214500F (AA016), and 37C14214500K (AA014).

FEATURES

Control Circuit

The control circuit provides automatic or manual control of the Auto-Booster. The Raise, Auto and Lower push button switches establish the interface. In the Auto mode, the voltage supply from the utility winding of the auto-booster is compared with the preset values of Set Voltage and Band-width. If the voltage falls outside the band a time delay sequence is initiated. At the end of the time delay, a corrective tap change direction is stated.

Bandwidth

The bandwidth is displayed when this switch is pressed. The bandwidth can be set for 3.0, 4.0, 5.0 or 6.0 in 1.0 volt increments. Pressing the switch and watching the value increment can change this value. It will roll over from 6.0 to 3.0 volts. Once the changed value is selected, release the switch and the display will blink for two seconds and then display the new value. This confirms that the new value is stored in non-volatile memory.

Voltage

RMS Voltage (120-Volt Base) is displayed when this switch is pressed. The accuracy is +/- 0.2 VAC over the operating range of 105.0 to 140.0 volts. Test receptacle jacks are also located externally at the bottom of the control enclosure. These receptacle jacks are not grounded.

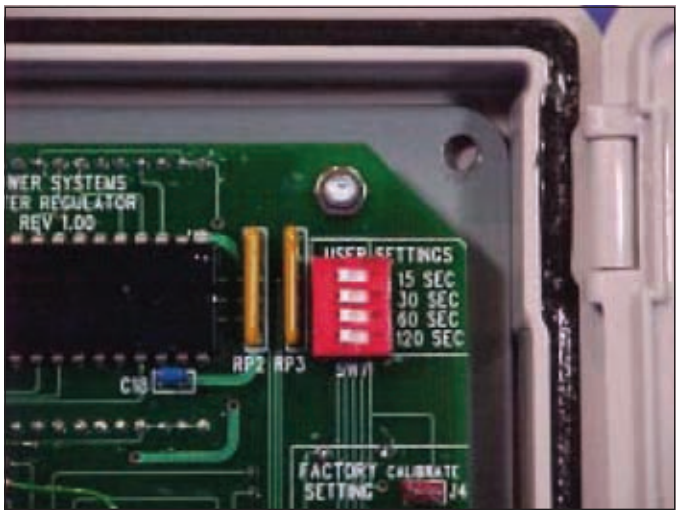

Figure 2.
Auto-Booster Regulator Control Printed Circuit Board.

Set Voltage

The set voltage is displayed when this switch is pressed. Available operating range is 105.0 to 140.0 volts in 0.1 volt increments. Pressing and holding in the switch causes the value to increment. The value will roll over from 140.0 to 105.0 volts. Once the value is selected, release the switch and the display will blink for two seconds and then display the new value. This confirms that the new value is stored in non-volatile memory.

Raise

The Raise shaded coil of the energized tap changer is shorted and a Raise tap change is initiated when this switch is activated. Raise tap changes will continue until the Auto switch is pressed or the Raise switch is pressed toggling its operation to Auto.

Auto

The control will operate in the Auto mode when this switch is pressed. In this mode the input control voltage is monitored. When the control goes out-of-band, the appropriate Low or High LED is illuminated. If a time delay has been selected the time out will begin. If the voltage stays out of band and the time delay times out, the motor will be energized and a tap change is initiated. If this switch is pressed and held for three seconds the Auto mode will be turned off and the display will show "OFF". In this mode the voltage can go out-of-band and time out but the motor will not be energized. Pressing the Auto switch will revert back to the Auto mode of operation.

Lower

The lower shaded coil of the energized tap changer is shorted and a Lower tap change is initiated when this switch is activated. Lower tap changes will continue until the Auto switch is pressed or the Lower switch is pressed toggling its operation to Auto.

Time Delay

Selecting dipswitch positions on the back of the printed circuit, Figure 2, of 15, 30, 60, and 120 seconds will program the time delay. This will result in the additive selections yielding a time delay setting of 0, 15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 195, 210, and 225 seconds. These selections add to the inherent time delay of 30 seconds due to the spring wind-up of the tap changer on the first tap change. For example, if a user selects, via the printed circuit board time delay switches, a time delay of 15 seconds, the first tap will occur after 45 seconds (30 seconds inherent to the tap changer plus 15 seconds additive time delay) has expired if the voltage had stayed out of band for 15 seconds.

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2300 Badger Drive
Waukesha, WI 53188 USA
www.cooperpower.com