

Reclosers

Service Information

Form 4C Microprocessor-Based Recloser Control
Station Battery Backup Accessory

S280-77-5

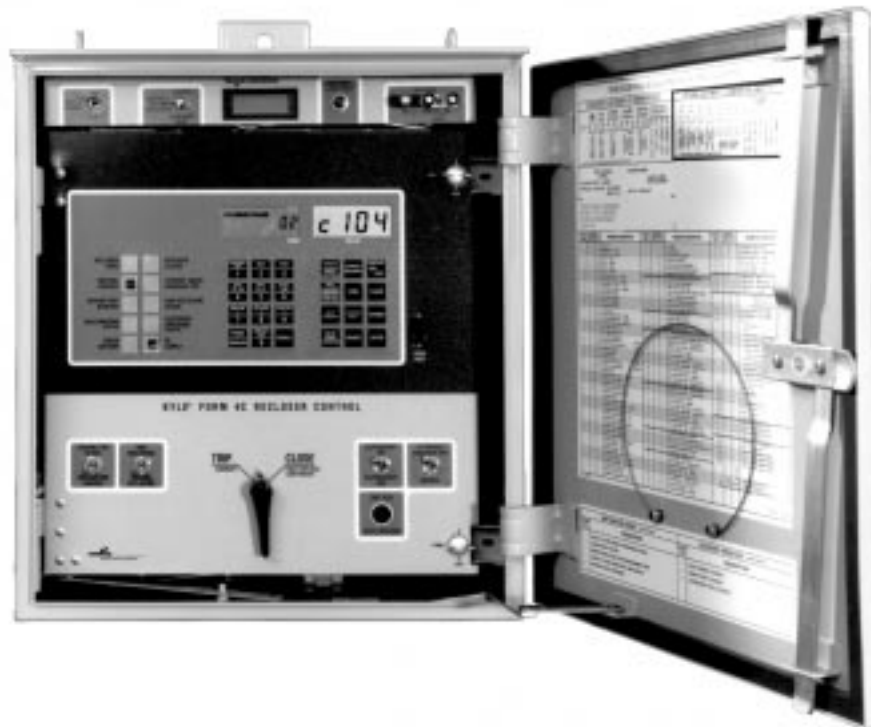


Figure 1.
Kyle® Form 4C Microprocessor-Based Recloser Control.

911064KM-F

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SAFETY FOR LIFE



Kyle Distribution Switchgear 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 Kyle 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


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 contains two types of hazard statements:

 **WARNING: Refers to hazards or unsafe practices which can result in death, severe personal injury, and equipment damage.**

 **CAUTION: Refers to hazards or unsafe practices which can result in damage to equipment or in personal injury.**

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


G103.2

 **WARNING: This equipment requires routine inspection and maintenance to ensure proper operation. If it is not maintained it can fail to operate properly. Improper operation may cause equipment damage and possible personal injury.**


G105.1

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.

 **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.**

G101.0

 **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 can result in death, severe personal injury and equipment damage.**

G102.1



PRODUCT INFORMATION

Introduction

Service Information S280-77-5 provides operating information for the Form 4C recloser control Dc Station Battery Back-Up accessory. This accessory is customer-specified and is used with a Form 4C that is mounted in a location where an external dc supply is available for back-up power. It is to be used in place of the internal back-up battery. There are two options available with this station battery back-up accessory:

No alarm upon loss of dc supply

Alarm upon loss of dc supply

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 process described, nor to provide directions for meeting every possible contingency during installation, operation, or maintenance. When additional information is desired to satisfy a problem not covered sufficiently for the user's purpose, please contact your Cooper Power Systems Division sales engineer.

Acceptance and Initial Inspection

Each control is completely assembled, inspected, and tested at the factory. It is in good condition when accepted by the carrier for shipment.

Handling and Storage

If the control is to be stored for an appreciable time before installation, provide a clean, dry storage area. Locate the control so as to minimize the possibility of damage.

Description of Operation

The Form 4C microprocessor-based recloser control is powered from a 120 Vac or 240 Vac supply with a 24 Vdc lead-acid battery provided as standard for back-up supply. For applications where a station battery is present, the Form 4C can be ordered to allow the use of the station battery as the back-up supply in place of the Form 4C internal battery with either 24V, 48V or 125Vdc available as an input.

NOTE: An ac source is still required for primary supply.

The external dc supply is brought into the +/- terminals located above the ac power supply board where it then runs through a dc to dc converter contained inside the control.

ANSI Standards

Kyle reclosers are designed and tested in accordance with the following ANSI standards: C37.60, C37.61 and C37.85

ISO Standards

The Quality System at the Cooper Power Systems Kyle Distribution Switchgear plant is ISO 9001 certified.

Without Loss of Dc Alarm

When the station battery back-up accessory is specified, alarm upon loss of dc voltage is not provided. The control will operate off the ac source until that source is lost, at which time the control will automatically switch to the station battery and a loss of ac alarm will be initiated. If at any time the dc back-up supply is lost, there will be no external dc alarm or indication. With this device, there will be no dc alarm function when the control is powered from the dc to dc converter.

With Loss of Dc Alarm

The station battery back-up accessory can be provided with an option which allows for external indication upon loss of dc voltage. This option must be specified at the time of order. The control will operate off the ac source until that source is lost, at which time the control will automatically switch to the station battery and a loss of ac alarm will be initiated. The external indication option permits the use of the Form 4C's battery alarm function when back-up dc supply is lost. The battery alarm consists of both the malfunction indicator, which has a local (front panel LCD, code 66), and remote (standard I/O board status contact) indication and the power status indicator which also consists of a local (front panel LCD "Check Battery") and remote (standard I/O board status contact) means of indicating loss of dc supply. For additional information on the I/O board status indications, refer to *S280-77-1 and S280-77-4*.

Dc-to-Dc Converter

The dc voltage is monitored on the output of the dc-to-dc converter contained inside the control. Unlike the Form 4C, with internal 24 Vdc battery, the monitoring/alarm system operates as GO/NO GO. As long as the station battery is providing the minimum operating voltage, the output of the dc to dc converter will be 32.0 V which is required to operate the control and no loss of dc indication will result. If the substation battery drops below the minimum threshold value, the measured output of the dc-to-dc converter will be zero, and the two dc alarm systems will function, provided there is ac power to the control. The alarms will signal within a maximum time of 150 seconds, due to the internal circuit capacitance needing to discharge. The following voltage range input to the dc to dc converter is required for proper operation of the control:

24 Vdc system => input supply range of 20 to 60 Vdc

48 Vdc system => input supply range of 20 to 60 Vdc

125 Vdc system => input supply range of 70 to 140 Vdc

Applying voltages less than or greater than those listed above may result in damage to the dc-to-dc converter. These are reference voltages so at some point below the minimum input voltage, the output of the dc to dc converter will go to zero volts and the control will shut down if it is being powered from the dc supply. Once the minimum dc operating voltage is restored, the control will reset and resume operation. If the control is powered from the ac supply and the converter goes to zero volts, the control will not shut down and a loss of dc alarm indication will result.

The voltmeter on the Form 4C upper front panel measures the output of the dc-to-dc converter. As long as the station battery is connected and the voltage is greater than the voltage range listed above, the voltmeter will read in the range of 29 to 32 Vdc. This is true regardless of the dc back-up voltage system. Once the battery is disconnected or the input voltage drops below the minimum, the voltmeter should read zero volts.

The voltmeter is not intended to check the station battery and should not be used in place of the customers station battery monitoring system.

The battery panel meter provides indication of dc-to-dc converter voltage output and load current supplied by the converter. Also, the I/O status contacts and battery check LCD on the Form 4C front panel is activated by monitoring the output of the converter and not the customer battery.

TESTING

All controls are tested at the factory before shipment. If incoming acceptance testing is required, then the following items must be observed. **Failure to do so may result in damage to the control, damage to the dc power supply, or both.**

To test, connect the dc supply to the +/- terminals on the power supply board located in the Form 4C.

An ac supply to the control must be present for alarms to function.

If possible, use an actual battery for test. If a battery is not available, a rectified and regulated power supply must be used. Do not use an unrectified or an unregulated power supply as the ripple currents may damage components in the Form 4C. The Form 4C will draw approximately 2.5 watts of power.

The dc input voltage should not be ramped up or down but should be preset to the proper voltage level and then turned on and off. To test the dc alarm, the dc supply should be turned off, since dropping the dc voltage below the above listed range may result in damage to the dc-to-dc converter.



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