Voltage Regulators

COOPER

Cooper Power Systems

McGraw-Edison® Data Reader
Operating Instructions

Service Information

S225-30-1

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INTRODUCTION

The McGraw-Edison Data Reader, developed by Cooper Power Systems, is a portable, hand-held recorder designed for the retrieval of data from advanced control devices. It will retrieve data from the Kyle® Form 4C recloser control, the McGraw-Edison CL-4, CL-4B, CL-4C, and CL-5A regulator controls, and the McGraw-Edison Meter Pac metering device. The Data Reader allows a field technician to quickly read and store data from each of these control devices by pressing a single button. The retrieved data is individually coded by equipment type and serial number and can later be transferred to an IBM-PC compatible computer for analysis. This makes system analysis easier and more precise by transporting large quantities of system data quickly, economically, and accurately.

HOW THE DATA READER WORKS
Data Base

Two features of Cooper Power Systems advanced control devices are the operating systems and the structured data bases. Pertinent internal variables are organized into a data base which uses a point type/point number concept. For example, the POWER FACTOR AT MAXIMUM kVA DEMAND (a regulator control data point) is assigned a point type three and a point number twelve. As each control device is being read, the Data reader simply requests all of the point numbers in each of the different point types. The generic nature of this design allows the Data reader to be used with any Cooper Power Systems advanced control device which incorporates the point type/point number data structure.

Battery Check

When the "START DATA READING" button is pressed, the microprocessor causes all three LED lights to turn on for approximately two seconds. Through the built-in analog-to-digital converter, it then performs a battery load test by sampling the battery voltage while all three lights are on. If the voltage is determined to be inadequate to support a data read or transfer cycle, the Data Reader LED lights remain lit for more than two (2) seconds while the button is depressed. previously read data is retained in memory. The battery can by changed as described in the section "Replacing the Battery".

Data RETRIEVAL

Assuming the battery contains an adequate charge to support the reading cycle, the top two LED lights will turn off, but the "BATTERY OK" light will remain on for approximately three more seconds. The "BATTERY OK" light will then turn off, and the "READING" light will turn on. At this point, the Data Reader will initiate a series of requests for all of the internal points contained in the connected control device. When the data transfer completes successfully (approximately three seconds, depending upon the control type), the "READING" light will turn off and the "READING COMPLETE" light will turn on for approximately three seconds. The reader then switches itself off.

Data Storage

The data gathered by the Data Reader is packed into the battery-backed RAM. Data error checks are incorporated within the request and response messages to maintain the data integrity. In addition, overall data reading checksums are established and saved in an electrically erasable, programmable, read-only memory to assure the validity of the battery-backed information.

Data Transfer to Computer

The Data Reader's recorded data can be transferred using a data transfer cable to an IBM-PC compatible computer. The data transfer program, run on the computer, instructs the user to press the "START DATA READING" button on the Data Reader to start the data transfer sequence. Once the reader recognizes that it is not connected to a control device, it switches on its previously idle RS-232 communications circuit and will attempt to establish a data link with the connected computer. After the communications link is established, the Data Reader will respond to incoming data request messages. The computer program automatically requests, receives, and verifies the data readings as it formulates the information transferred from the Data reader onto the disk. (The P.C. software installation and use is described in a separate manual, R225-90-3).

SPECIFICATIONS

A.	Physical Size	4' W" 7½" H, 1 " D	
B.	Weight	10½ oz.	
C.	Battery	9V Transistor	
D.	Memory Capacity	64K Bytes	
E.	Memory Type	Static RAM	
F.	Number of Readings by Device Type		
	1. F4C	Recloser Control	20
	2. CL-4	Regulator Control	99
	3. CL-4B	Regulator Control	99
	4. CL-4C	Regulator Control	99
	5. CL-5A	Regulator Control	25
	6. Meter Pac	Metering Device	99

DATA READER OPERATION
Data RETRIEVAL

1. The control device from which the data is to be retrieved must be energized.
2. Using the customer molded black coil cord, connect the Data Reader to the control device (F4C, CL-4C, CL-5A, Meter Pac, etc.) Note: Do not connect the Data Reader directly into any Data Port without using the cord.
3. Press the "START DATA READING" button and hold it down. All three LED lights will turn on.
4. The lights will then turn on to indicate the status of the data transfer, advancing from "BATTERY OK" to "READING" to "READING COMPLETE". This will take about five seconds, depending upon which control device is being read. The data reading activity does not interfere with the operation of the control device.
5. When the reading is complete, unplug the black coil cord from the data port of the control device.

Special Note for Regulator Control Users . . . To verify that a proper reading has been transferred to the Data Reader, the operator may enter function code 62 (Data Port Status) prior to step 3 above, and observe the display during the reading process. The function code 62 display will change, typically in the order of 2 (or 5), then 0, then 7. This sequence indicates a successful transfer of data.

Data Transfer to Computer

1. The PC-based software is assumed to be installed on the computer and the appropriate interface screen must be active. Note: The PC software installation and use is described in another manual, R225-90-3.
2. Connect the gray computer cable to the serial port on the computer, and the Data Reader to this cable. Note: Do not connect the Data Reader directly into a computer port without using the cable.
3. As instructed by the computer program, press the "START DATA READING" button on the Data Reader and hold it down. All three LED lights will turn on. Approximately two seconds later, the top two lights should turn off and the bottom light, "BATTERY OK" should stay on. The button can now be released.
4. In approximately three seconds, communications are established with the computer and the "BATTERY OK" light will turn off. As data transfer takes place, all instructions at this point are shown on the computer screen. After the transfer is complete, the Data Reader memory can be erased as directed by the instructions on the computer screen.
5. Disconnect the Data Reader from the gray computer cable when completed.

REPLACING the Battery

The Data Reader is powered by a readily available 9 volt transistor battery. Any 9 volt transistor battery can be used for replacement. For a longer life, a high quality alkaline battery is recommended. The battery can be accessed by pressing down and sliding outward the compartment cover located on the back of the Data Reader.

If the battery requires replacement while data is contained in memory, the old battery can be disconnected and a new battery installed without losing this data. An internal charge-holding capacitor provides power for about one (1) minute to the memory when the battery is disconnected. The Data Reader must not be disconnected from its battery for more than one (1) minute or data will be lost.

TROUBLESHOOTING

Note: Always allow at least 10 seconds between reading attempts. The Data Reader first attempts to establish communications with a control device, and if a signal is not found, it will then look for signals from a computer. The entire sequence takes about 10 seconds and, during this time, it will not respond to actions from the button.

Data RETRIEVAL

If all three LED lights remain lit for more than two seconds while the button is depressed, then the battery is too weak for data transfer. Replace the battery.
If the "READING" light does not turn on following the "BATTERY OK" light, then communications with the control device were not established. Check the cable connections on both the Data Reader and control device being read and repeat the reading process.
If the "READING COMPLETE" light does not turn on after the "READING" light, then data transfer did not take place. Check the cable connections on both the Data Reader and control device being read, and repeat the reading process. If the problem persists, the Data Reader's memory may be filled to capacity. (It will not over-write data already in memory.) This can be confirmed by connecting the Data Reader to the computer and using the computer software. The Data Reader's memory can be erased using this software.

Data Transfer to Computer

If all three LED lights remain lit for more than two (2) seconds while the button is depressed, then the battery is too weak for data transfer. Replace the battery.
If the computer screen does not acknowledge that communications have been established with the Data Reader, check the cable connections on both the Data Reader and the computer, and repeat the process. If the problem persists, confirm that the computer port is a serial port.

Troubleshooting Assistance

For additional trouble shooting assistance contact:

Cooper Power Systems
2300 Badger Drive
Waukesha, WI 53188-5951
(414) 896-2417

PARTS LIST

Below is a list of the parts that may be ordered to compliment the Data Reader use.

	Part Number
Data Reader, carrying case, computer cable, coil cord, and software with manual	A64215000A
Data Reader assembly (Data Reader and coil cord)	A64271800A
Data Reader only	A64215100A
Coil cord only	A64215300A
Computer cable only	A64215200A
Data Reader carrying case only	A642644001
Data Reader software and manual	R225-90-2

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