UNICO ®

Objectives

1. To isolate and troubleshoot to the level of modular components
2. To read and comprehend UNICO's system prints and software documentation
3. To understand the function and use of serial communication
4. To understand software and hardware system fault diagnostics
5. To distinguish between normal and abnormal operation
6. To monitor system inputs and outputs to determine the status of the system
7. To locate important system test points for direction to problem areas
8. To understand terminology associated with a drive system

Content

Manuals and Drawings

1. Understanding how to read and use system prints and manuals
2. Using system software documentation to assist in troubleshooting
3. Understanding how the application program uses setup data
4. Altering setup parameters to assist in troubleshooting
5. Understanding the function of DIP switches and jumpers

Physical Identification

1. Locating and identifying the controller, serial communication devices, and feedback devices
2. Identifying modules by name and function within the system
3. Identifying modules that occupy dedicated positions within

Servo Theory

1. Differentiating between open- and closed-loop systems
2. Types of servo-loop systems used by UNICO (hardware vs. software)
3. Phasing a servo loop and the results of an improperly phased drive
4. Explanation and definition of position loop, velocity loop, and current loop
5. Closing the position and velocity loop with more than one feedback device

Communication

1. Accessing serial communication and changing setup data using the HMI
2. Monitoring readouts for troubleshooting purposes
3. Understanding keystroke commands
4. Using different monitors with the system

Content
(continued)

Feedback Devices

1. Understanding pulse generator feedback, including quadrature, single-ended, and differential signals
2. Understanding linear absolute encoder feedback, including clock and gate signals
3. Understanding resolver feedback, including sine and cosine signals

System Layout

1. Understanding how hardware and software function together as a system using block and single-line diagrams
2. Identifying the primary function of each module
3. Understanding how the system coordinates multiple axes
4. Using block diagrams to isolate problems to specific areas

SCR Amplifiers

1. Identifying amplifier components, including SCRs, current feedback device, snubber circuit, firing module, Eout, and SCR terminal strip
2. Explanation of the function of each terminal board component
3. Snubber circuits and why they are needed
4. Understanding and observing test points on the SCR terminal strip, including current command, current feedback, current error, and emf
5. Symptoms of a shorted or open SCR
6. Explanation and illustration of an open-loop test on an amplifier
7. Identifying the working components needed to turn on the SCRs

PWM Amplifiers

1. Identifying amplifier components, including transistors, current feedback device, heat sink, thermal switch, shunt regulator, and bus discharge circuit
2. Understanding basic PWM operation
3. Block diagram of DSP operation
4. Function and use of the keyboard monitor
5. Test points and troubleshooting techniques
6. Examining nominal test point charts
7. Simulation of common problems and their symptoms
8. Interfacing between I/O racks and the amplifier
9. Physical identification and review of amplifier terminology
10. Troubleshooting hardware using software fault diagnostics

Troubleshooting

1. Using hands-on troubleshooting to instill confidence in working with UNICO equipment
2. Learning systematic troubleshooting techniques using simulated problems
3. Troubleshooting using a functional understanding of the system

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