



EPSON RC+ Robot Maintenance SCARA

Day 1

- A. Introduction
 - A.1. Safety Overview (Lecture)
 - A.1.1. Power on , Power off
 - A.2. Robot Coordinate system
 - A.3. Z brake release button
 - A.4. Identification
 - A.5. Specification
 - A.6. Cable Connections
 - A.7. Controller Models
- B. Replacing the Motors, Ball screw spline and Reduction Gears
 - B.1. Removing the covers
 - B.2. Joint 3 Motor
 - B.3. Joint 3 Brake
 - B.4. Joint 4 Motor (Brake on some models)
 - B.5. Ball Screw Spline Replacement
 - B.5.1 Zero backlash gear service (G10+)
 - B.6. Harmonic Drive Video
 - B.7. Joint 2 Motor
 - B.8. Joint 1 Motor
 - B.9. HD Reduction Gear Unit (Lecture and demo unit)
 - B.10.
- C. Cable Replacement
 - C.1 Procedure Review
- D. Calibration
 - D.1. Robot Coarse Calibration (Lecture)
 - D.1.1. Using Specifications to position J3 & J4
 - D.2. Robot Fine Calibration (Lecture)
 - D.3. HOFs
 - D.4. CALPLS
 - D.5. CALIB
 - D.6. Monument Position
 - D.6.1. Calibrating motors to a known position

Day 2

- E. Encoder and Battery Board Maintenance
 - E.1. Absolute (Lecture)
 - E.2. Battery Replacement
 - E.3. Back up battery ports
- F. Maintenance backup procedures
 - F.1. Backup Controller
 - F.2. Controller Status
 - F.3. Recovery



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Day 2 - continued

- G. Description and Function
 - G.1. Standard specification
 - G.2. Front and Rear Panels
 - G.2.1. Connections
 - G.2.2. Filter
 - G.2.3. LEDs
 - G.3. Optional Device Connector
 - G.4. Teach/Auto Mode
- H. EPSON RC+ Overview (Lecture notes only)
 - H.1. Introduction to EPSON RC+
 - H.1.1. Command Mode
 - H.2. Points
 - H.2.1. Point Files
 - H.2.2. Point File Editor
 - H.2.3. Jog and Teach Screen Basics
 - H.2.4. Direct Teaching
 - H.3. Beginning SPEL Commands
 - H.3.1. MOTOR ON/OFF
 - H.3.2. RESET
 - H.4. Motion Commands
 - H.4.1. GO
 - H.4.2. JUMP
 - H.4.3. MOVE
- I. Inputs and Outputs (Lecture notes only)
 - I.1. I/O Monitor
 - I.2. Inputs
 - I.2.1. WAIT SW
 - I.2.2. PRINT SW
 - I.3. Outputs
 - I.3.1. ON
 - I.3.2. OFF
- J. Lab 1
 - J.1. Objective: Using the GO, JUMP and MOVE commands, robot motion between two points using all three commands.
 - J.2. Review Lab - discussion
- K. EPSON RC+ Controller
 - K.1. Power
 - K.1.1. Power Requirements
 - K.2. Controller Schematic
 - K.3. CPU Board
 - K.3.1. CPU Replacement battery
 - K.4. Servo pack service
 - K.5. Integrated Digital Inputs & Outputs
 - K.5.1. PNP / NPN



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Day 3 (for 8 hour a day course length)

- L. Controller components
 - L.1. Layout
 - L.2. Switching Power Supply
 - L.3. Drive Power Board
 - L.4. Drive Main Board
 - L.4.1. Jumper settings
 - L.5. Motor Power Module
 - L.6. Motor Driver Module
 - L.7. Regeneration Module
 - L.8. Cooling Fans
 - L.9. Filters
 - L.10. Review of Emergency Stop & Safeguard Circuit
 - L.11. Error Codes
 - L.11.1. Refer to Epson RC+ help file
 - L.12. CPU Boards
 - L.12.1. Compact Flash

- M. Troubleshooting and Overview
 - M.1. Discussion
 - M.2. (3) labs covering actual problem solving
- N. Course Review / Question and answer
- O. Preventative Maintenance
- P. Spares