



**Kawasaki Robotics (USA), Inc.**

**Kawasaki Robotics (USA), Inc.**

**Course Catalog**

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## **KAWASAKI ROBOTICS**

### **NORTH AMERICAN TRAINING CENTER**

Training courses covering robot operation, programming, electrical maintenance, and mechanical preventive maintenance are available from Kawasaki Robotics (USA), Inc. These courses are conducted at the Kawasaki Robotics North American Training Center (KRINATC) located in Wixom, Michigan.

Contact Information:

**Kawasaki Robotics (USA), Inc.**  
**North American Training Center**  
28140 Lakeview Drive  
Wixom, Michigan 48393

Training & Documentation Coordinator  
248.446.4297  
Email: [training@kri-us.com](mailto:training@kri-us.com)

**Web Address:** <http://www.kawasakirobotics.com/training>

#### **Class Schedule**

Class schedule is available at [www.kawasakirobotics.com/training](http://www.kawasakirobotics.com/training). Classes are also scheduled on an as-needed basis. Please contact T&D for currently available classes and openings. Students may enroll at any time. The Training Center is closed on all official state and federal holidays.

#### **Facilities**

The Kawasaki Robotics North American Training Center is located inside of Kawasaki Robotics (USA), Inc, North American headquarters in Wixom, Michigan. The training center consists of approximately 7500 sq. ft. of floor space containing 4 classrooms, 8 robot cells, student break area and restrooms.

#### **Class Hours**

All training classes begin at 8:00 a.m. and end at 4:30 p.m., with a 15 minute break in the morning and a second in the afternoon. Lunch hour is from 11:45 a.m. - 12:45 p.m. Access to the building is not available until 7:55 a.m.

## **Parking**

Parking is available on the west side (front) of the building. Enter the building through the student entrance on the south side of the building. There is a sign posted with all the classes listed including the classroom number. Classrooms are located off the training lab.

## **Student Building Access**

Student activities are restricted to the laboratory, classrooms, student kitchen and restrooms. If for any reason the student needs access to other parts of the building, please see the Instructor. If the student needs to set up a meeting with a member of the Kawasaki Robotics staff, please have the Instructor set up the meeting so it does not conflict with the classroom or lab instruction.

## **Recommended Attire**

Casual attire, such as sweaters, sweatshirts, T-shirts, jeans, slacks, sport shirts, flannel shirts, sport coats, closed toed leather shoes, are appropriate for all programming, and electrical maintenance classes. Shorts, skirts, tennis shoes, open toed shoes, tank tops, and inappropriate logos are unacceptable and not permitted in the training center. For students attending mechanical preventive maintenance classes steel toed boots are required, and it is suggested to bring coveralls or lab coats to protect their clothing from grease and lubricants used during the hands-on portions of the class.

## **Student Refreshments**

Coffee, tea, and hot chocolate are provided at no charge and vending machines are available in the student kitchen for soft drinks and snacks. Students are responsible for their own lunch arrangements. A list of area restaurants is available in class.

## **Food and Drinks in the Laboratory**

Food and drinks may be consumed in the laboratory. However, NO LIQUID OR DEBRIS is allowed on or around the robots and/or controllers. If this policy is not strictly adhered to, the Instructor may restrict the consumption of food and drink to outside the laboratory setting.

### **Equipment Operation**

All laboratory activities and equipment operation must be performed in the presence of a Kawasaki Robotics Instructor.

### **Phones and Messages**

If you need to place a phone call, see your Instructor. The phones in the laboratory are for internal calls only. Local outside calls may be made from the student lunch area during break times. Long distance phone calls are discouraged except in emergency situations - please see Kawasaki Robotics staff for assistance. It is the policy of the Kawasaki Robotics training and development staff not to interrupt the class for incoming phone messages unless an emergency situation exists. Kawasaki Robotics personnel will take messages for the return of non-emergency phone calls.

### **Smoking Policy**

Kawasaki Robotics maintains a smoke free environment. Smoking is permitted outside of the building only.

### **Emergency Phone Numbers**

In the event of an emergency that demands your immediate response, inform your instructor or call the Receptionist at Ext. 4220.

Local Fire, Police, Ambulance: 8-911

Sheriff - Oakland County: 8-911

State Police - Northville: 8-1-248-348-1505

## Driving Directions

Directions from Detroit Metro Airport (DTW) to Kawasaki Robotics:

1. Start going toward the AIRPORT EXIT on WILLIAM G ROGELL DR (0.0 miles)
2. Continue on MERRIMAN RD (0.4 miles)
3. Take the I-94 WEST ramp toward CHICAGO (0.7 miles)
4. Merge on I-94 WEST (2.9 miles)
5. Take the I-275 exit toward FLINT/TOLEDO, exit #194 (0.2 miles)
6. Continue on I-275 NORTH RAMP toward FLINT (0.7 miles)
7. Merge on I-275 NORTH (12.3 miles)
8. Continue on I-96 WEST/I-275 NORTH (5.1 miles)
9. Take the I-96 WEST exit toward LANSING (2.4 miles)
10. Merge on I-96 WEST (4.4 miles)
11. Take the WIXOM RD exit #159; turn left (South)
12. Continue on WIXOM RD (0.3 miles) to the second traffic light, Grand River Ave.
13. Turn right on Grand River; go approximately 1.5 miles to Automation Blvd., turn left (South)
14. Follow Automation Blvd. 0.1 miles, turn left on Lakeview Drive, 0.2 miles to Kawasaki

### Hotels and Motels

The following list is provided for the selection of accommodations that are in the proximity of Kawasaki Robotics. Kawasaki does not verify the quality or availability of the following hotels and provides this list for your information only. The locations of the hotels are indicated by number on the following map and the driving distances listed are from the Kawasaki office. Discounted rates may be available; inquire about Kawasaki rate when making reservations.

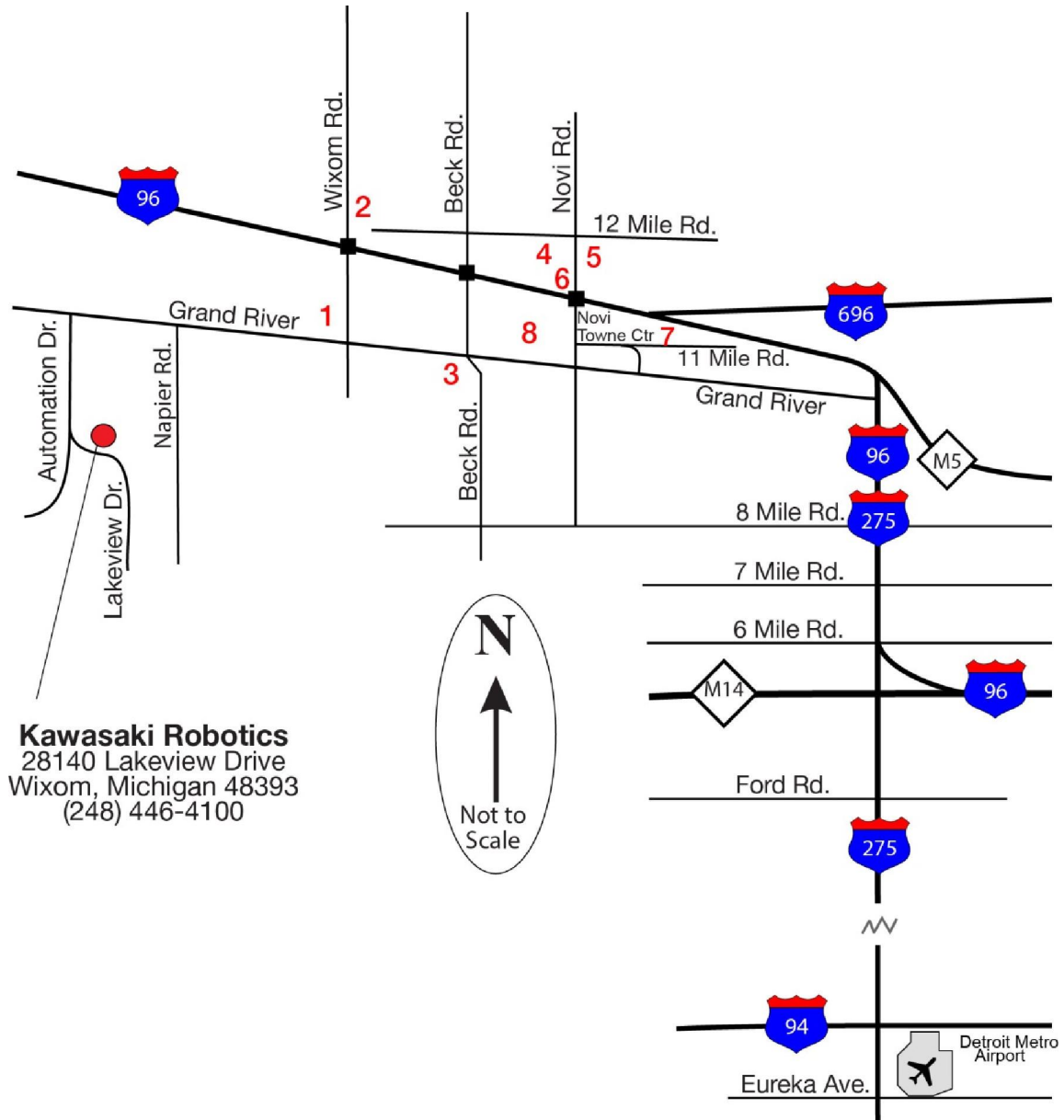
<b>Detail No.</b>	<b>Hotel Name</b>	<b>Address</b>	<b>Phone</b>	<b>Driving Distance (Miles)</b>
<b>1</b>	Comfort Suites Wixom	28049 Wixom Rd, Wixom, MI 48393	(248) 504-5080	1.8
<b>2</b>	Holiday Inn Express	48953 Alpha Tech Drive, Wixom, MI 48393	(248) 735-2781	2.5
<b>3</b>	Staybridge Suites	27000 Providence Pkwy, Novi, MI 48374	(248) 349-4600	3.1
<b>4</b>	Residence Inn Marriott	27477 Cabaret Drive, Novi, MI 48377	(248) 735-7400	5.0
<b>5</b>	The Baronette Renaissance	27790 Novi Rd, Novi, MI 48377	(248) 348-5000	4.5
<b>6</b>	Crowne Plaza Novi	27000 Karevich Drive, Novi, MI 48377	(248) 348-5000	5.7
<b>7</b>	DoubleTree Novi	42100 Crescent Blvd, Novi, MI 48375	(248) 344-8800	4.5
<b>8</b>	Hyatt Place	46080 Grand River Ave, Novi, MI 48374	(248) 513-4111	3.7



**Kawasaki Robotics (USA), Inc.**

28140 Lakeview Drive, Wixom, MI 48393 Tel: (248) 446-4100 Fax: (248) 446-4200 www.kawasakirobotics.com

KRI-NATC SCHOOL CATALOG





## COURSE DESCRIPTIONS

The following pages contain descriptions and outlines for currently available Kawasaki Robotics training courses. Please contact the Kawasaki Robotics training department for availability and scheduling.

**P:** 248.446.4247

**E:** [training@kri-us.com](mailto:training@kri-us.com)

## E CONTROLLER TWO DAY OPERATION ORIENTATION

(Course Number CORECONT)

This course is designed for students who are currently proficient in the programming and operation of Kawasaki D-series controller robot systems. The E Controller Operation Orientation Course is a fast paced course that provides students with both classroom instruction and hands-on practical lab experience. The course is designed to teach students E-series controller operations and programming by building upon their existing knowledge of D-series controllers. Students will also learn to perform tasks that utilize the improved capabilities and features of the E-series controller. Training is focused on comparisons between the D-series controller and the E-series controller and demonstrating how familiar procedures are accomplished with E-series controller.

**Course Goal:** Upon successful completion the student should be able to program and operate the Kawasaki E-series controller robot system.

**Audience:** This course is intended for individuals who are currently responsible for the programming and operation of Kawasaki D-series controller robot systems and who will have the same responsibilities with E-series controller robot systems.

**Prerequisites:** D Series Controller Operations and Programming

**Course Length:** 14 clock hours

## E CONTROLLER TWO DAY OPERATION ORIENTATION COURSE OUTLINE

- Course Registration
- Introduction and Overview
- Safety
- User Interfaces
- Teach Pendant
- Teach Pendant Operations
- Jogging
- Recording and Executing Programs
- Auxiliary Functions
- Editing Programs
- Interface Panel
- Data Control
- Error Recovery
- Review
- Course Evaluations

## D OR E CONTROLLER OPERATION AND PROGRAMMING

(Course Number COECONT)

The D or E Controller Operation and Programming Course is designed to offer basic operations, safety, and basic programming training to Kawasaki robot operators, technicians, engineers, and programmers. This course consists of approximately 50% classroom presentation and 50% hands-on lab exercises.

**Course Goal:** Upon successful completion, the student should be able to: demonstrate familiarity with all user interfaces and be able to perform all necessary power-up and power-down procedures; jog the robot in both joint mode and in Cartesian coordinates; create a Block Step program, teach a path, and edit and play back a path in both the single-step and continuous modes of operation.

**Audience:** This course is primarily intended for individuals who operate, program, and maintain the robot on a day-to-day basis, and other candidates who have the desire to be knowledgeable on the operations and programming of the Kawasaki D&E Series Controllers.

**Prerequisites:** None

**Course Length:** 28 clock hours

## D OR E CONTROLLER OPERATION AND PROGRAMMING COURSE OUTLINE

- Course Registration
- General Robotics
- Introduction
- Safety
- Overview
- Power On/Off Procedures
- Teach Pendant Introduction
- Teaching Program Data
- Testing Program Data
- Executing Program Data
- Editing Program Data
- Data Management
- Printing Data
- AUX Menu Functions
- Final Review and Evaluation

## E CONTROLLER EP TYPE OPERATIONS AND PROGRAMMING

(Course Number COEPECONT)

The E Controller EP Type Operations and Programming course is designed for operators and maintenance personnel. This course provides information about safety, user interfaces, setting auxiliary data, recording programs, checking and modifying programs, and manual and automatic playback.

**Goal:** Upon successful completion of the E Controller EP Type Operations and Programming course, the student should be able to perform the following:

- jog the robot in all coordinate system modes
- set auxiliary data parameters
- record and verify programs
- modify program step locations
- play back programs in both manual and automatic modes
- set repeat conditions
- copy programs and transfer portions of programs
- set a home position
- save and load data using the floppy disk drive
- use error and operation logging functions
- use the mirror conversion function
- use the XYZ shift function
- use the tool shift function
- program the software interface panel

**Audience:** E Controller EP Type operators and maintenance personnel

**Prerequisites:** None

**Course Length:** 28 clock hours

## E CONTROLLER EP TYPE OPERATIONS AND PROGRAMMING COURSE OUTLINE

- Course Registration
- General Robotics
- Introduction
- Safety
- Overview
- Power On/Off Procedures
- Teach Pendant Introduction
- Teaching Program Data
- Testing Program Data
- Executing Program Data
- Editing Program Data
- Data Management
- Printing Data
- AUX Menu Functions
- Final Review and Evaluation

## AS LANGUAGE PROGRAMMING

(Course Number CPECON)

This course is designed to introduce the AS programming language to Kawasaki robot operators, technicians, engineers, and programmers. The student is introduced to the commands, syntax, and structure of the AS language programming system. This course consists of approximately 50% classroom presentation and 50% hands-on lab exercises.

**Course Goal:** Upon successful completion of this course, the student should be able to perform all necessary functions to create, edit and execute an advanced high-level program using the AS Language.

**Audience:** This course is primarily intended for individuals who program Kawasaki controllers on a day-to-day basis and other candidates who may wish to extend their programming knowledge. Students attending this course need to have a general knowledge of the operation of Kawasaki C, D, or E series controllers, as well as basic computer skills.

**Prerequisites:**

Prior to attending the AS Language course, students should have attended one of the following courses:

C, D, or E Controller Operations and Programming Course

**Note:** If the student prefers programming using a notebook/laptop computer, a computer with a RS232C port & a null modem cable, or Ethernet connection can be used in class.

**Course Length:** 28 clock hours



## AS LANGUAGE PROGRAMMING COURSE OUTLINE

- Introduction
- System Overview
- Safety
- Terminal Control Commands
- Editor Commands
- Transformations and Compound Transformations
- Defining Locations
- Data Control Commands
- Motion Control
- Robot Control Program Instructions
- Program Control Monitor Commands
- System Control Commands
- Output Signal Control
- Control Flow Program Instructions
- Real Value Functions
- Mathematical Functions
- Location Value Functions
- Process Control Programs
- PC Interface
- Mainline Programs
- Error Codes and Help Information
- Final Project
- Review and Course Evaluation

## KLOGIC BASIC OPERATION

(Course Number COKLOGIC)

The KLogic basic operation course is designed to introduce the KLogic sequence control software and KLadder programming software to Kawasaki robot operators, technicians, engineers, and programmers. This course consists of approximately 70% hands-on lab exercises and 30% classroom presentation.

**Goal:** Upon successful completion of this course, the student should be able to use KLogic software with discrete I/O board hardware to create, edit, and execute KLogic programs.

**Audience:** This course is intended for robot operators, technicians, engineers, and programmers that use KLogic I/O signal interface with discrete I/O board hardware.

**Prerequisites:**

D/E Controller Operation and Programming  
Experience with PLC programming is recommended.

**Course Length:** 7 clock hours

## KLOGIC BASIC OPERATION COURSE OUTLINE

- Safety
- Overview of KLogic/KLadder
- KLogic specifications
- Basic operation program
- Signal allocation/hexadecimal review
- Programming using KLadder
- RC menu
- Monitor menu
- Applicable AS language instructions
- Moving/copying data
- Input/edit comments and registers
- Search/jump in programs
- Program file management
- Printing files
- Numeric operation program
- Data register interface
- Final Review
- Course Evaluations

## D OR E CONTROLLER ROBOT SYSTEM INTEGRATION

(Course Number CIECON)

The D or E controller robot system integration course is designed for system integrators who are currently proficient with robot system integration. This is a fast paced course that provides students with both classroom instruction and hands-on lab exercises designed to build upon their existing knowledge of robot system installation, operation, and programming.

This course is approximately 25% classroom presentation and 75% hands-on lab exercises.

**Goal:** Upon successful completion of this course, the student should be able to install, operate, and program the Kawasaki D or E Controller robot system using existing documentation.

**Audience:** This course is primarily intended for robot system integrators who will install, operate, and program the Kawasaki D or E controller robot system.

**Prerequisites:** Individuals must have working knowledge and experience in robot operation, programming, and installation.

**Course Length:** 28 clock hours

## D OR E CONTROLLER ROBOT SYSTEM INTEGRATION COURSE OUTLINE

- Course Registration
- Available manuals and their content
- Safety
- Power On/Off Procedures
- Electrical system
- Power distribution - system components, circuit boards and grounding
- Alarm circuitry – safety circuits, error codes
- Identify existing I/O internal wiring to robot (clamps, sensor signals, etc.)
- Robot arm mounting holes
- Block step programming
- Jogging
- Create, check, edit and playback block step programs
- Signals – force ON/OFF, screens, signal names
- Wait override
- On-line edit screens
- Program teach pendant I/F panel software devices
- Selective auxiliary functions including save/load, error logs, zeroing, etc.
- Interpolation, speed, accuracy selection considerations
- Advanced level (AS) programming
- Monitor commands and program instructions
- Create, check, edit and playback mainline, subroutines and PC programs
- Optimum robot setup: Tool dimensions, load/weight, etc. parameters
- Preprogrammed AS language instructions
- Hybrid programs: Block step programs with AS language instructions
- PC interface – KCWIN32 and TCP/IP (Ethernet)
- I/O interface
- Discrete I/O
- DeviceNet
- KLogic
- Final Review and Evaluation

## D CONTROLLER ELECTRICAL MAINTENANCE AND TROUBLESHOOTING

(Course Number CEDCON)

The D Controller Electrical Maintenance and Troubleshooting Course is designed to introduce the student to the major electrical components of the Kawasaki D controller and its digital servo system. Included is a basic discussion on the digital servo theory and operation, and how to isolate controller and robot faults to major components or subassemblies using the available documentation.

**Course Goal:** Upon successful completion, the student should be able to maintain, troubleshoot, and repair the Kawasaki D Controller and the digital servo system using the available documentation, test equipment, and tools.

**Audience:** This course is primarily intended for individuals who are responsible for installing, repairing, testing, and maintaining the Kawasaki D controller. Students attending this class will need to possess previous knowledge and skills in electronics (digital and analog), as well as having familiarity with the use of digital multi-meters and basic hand tools.

**Prerequisites:** D or E Controller Operations and Programming (Course Number COECONT)

**Course Length:** 28 clock hours

## D CONTROLLER ELECTRICAL MAINTENANCE AND TROUBLESHOOTING COURSE OUTLINE

- Course Registration
- General Robotics
- Introduction
- Safety
- Overview
- Power Distribution
- Alarm Circuitry
- Teach Pendant and Operation Panel
- Printed Circuit Boards
- Servo System - Overview
- Servo System - Power Block
- Servo System - Motor and Encoder Feedback System
- Simple Zeroing
- Software Download Procedures
- Troubleshooting Error Conditions
- Final Review
- Course Evaluations

## E CONTROLLER ELECTRICAL MAINTENANCE AND TROUBLESHOOTING

(Course Number CEECON)

The E Controller Electrical Maintenance and Troubleshooting Course is designed to introduce the student to the major electrical components of the Kawasaki E controller and its digital servo system. Included is a basic discussion on the digital servo theory and operation, and how to isolate controller and robot faults to major components or subassemblies using the available documentation.

**Course Goal:** Upon successful completion, the student should be able to maintain, troubleshoot, and repair the Kawasaki E Controller and the digital servo system using the available documentation, test equipment, and tools.

**Audience:** This course is primarily intended for individuals who are responsible for installing, repairing, testing, and maintaining the Kawasaki E controller. Students attending this class will need to possess previous knowledge and skills in electronics (digital and analog), as well as having familiarity with the use of digital multi-meters and basic hand tools.

**Prerequisites:** E Controller Operations and Programming

**Course Length:** 28 clock hours



## E CONTROLLER ELECTRICAL MAINTENANCE AND TROUBLESHOOTING COURSE OUTLINE

- Course Registration
- General Robotics
- Introduction
- Safety
- Overview
- Power Distribution
- Alarm Circuitry
- Teach Pendant and Operation Panel
- Printed Circuit Boards
- Servo System - Overview
- Servo System - Power Block
- Servo System - Motor and Encoder Feedback System
- Simple Zeroing
- Software Download Procedures
- Troubleshooting Error Conditions
- Final Review
- Course Evaluations

## E CONTROLLER EP TYPE ELECTRICAL MAINTENANCE AND TROUBLESHOOTING

(Course Number CEEEPCON)

The E Controller EP Type Electrical Maintenance and Troubleshooting Course is designed to introduce the student to the major electrical components of the Kawasaki E controller EP Type and its digital servo system. Included is a basic discussion on the digital servo theory and operation, and how to isolate controller and robot faults to major components or subassemblies using the available documentation.

**Course Goal:** Upon successful completion, the student should be able to maintain, troubleshoot, and repair the Kawasaki E Controller EP Type and the digital servo system using the available documentation, test equipment, and tools.

**Audience:** This course is primarily intended for individuals who are responsible for installing, repairing, testing, and maintaining the Kawasaki E controller. Students attending this class will need to possess previous knowledge and skills in electronics (digital and analog), as well as having familiarity with the use of digital multi-meters and basic hand tools.

**Prerequisites:** E Controller EP Type Operations and Programming

**Course Length:** 28 clock hours

## E CONTROLLER EP TYPE ELECTRICAL MAINTENANCE AND TROUBLESHOOTING COURSE OUTLINE

- Course Registration
- General Robotics
- Introduction
- Safety
- Overview
- Power supplies
- Alarm Circuitry
- Multi-Function Panel and Operation Panel
- Printed Circuit Boards
- Servo System
- Software Download Procedures
- Simple Zeroing
- Error Conditions
- Troubleshooting
- Final Review
- Course Evaluations

## T CONTROLLER ELECTRICAL MAINTENANCE AND TROUBLESHOOTING

(Course Number CETCON)

The T Controller Electrical Maintenance and Troubleshooting Course is designed to introduce the student to the major electrical components of the Kawasaki T controller and its digital servo system. Included is a basic discussion on the digital servo theory and operation, and how to isolate controller and robot faults to major components or subassemblies using available documentation.

**Course Goal:** Upon successful completion, the student should be able to maintain, troubleshoot, and repair the Kawasaki T Controller and the digital servo system using the available documentation, test equipment, and tools.

**Audience:** This course is primarily intended for individuals who are responsible for installing, repairing, testing, and maintaining the Kawasaki T controller. Students attending this class will need to possess previous knowledge and skills in electronics (digital and analog), as well as having familiarity with the use of digital multi-meters and basic hand tools.

**Prerequisites:** S/S+ or T Controller Operations and Programming

**Course Length:** 28 clock hours

## T CONTROLLER ELECTRICAL MAINTENANCE AND TROUBLESHOOTING COURSE OUTLINE

- Course Registration
- General Robotics
- Introduction
- Safety
- Overview
- Power Distribution
- Alarm Circuitry
- Teach Pendant and Operation Panel
- Printed Circuit Boards
- Servo
- Simple Zeroing
- Cubic-S
- Software Download Procedures
- Troubleshooting Error Conditions
- Final Review
- Course Evaluations

**D OR E CONTROLLER ARC WELDING OPERATIONS AND PROGRAMMING**

(Course Number COEARCWELD)

The E Controller Arc Welding Operations/Programming course is designed to offer basic robot and arc welding equipment operations, programming, and safety training. Operations include D or E controller and basic arc welding equipment operations. Programming includes robot programs and welding subroutines. This course consists of approximately 50% classroom and 50% hands-on lab exercises.

**Course Goal:** Upon successful completion, the student should be able to demonstrate familiarity with all user interfaces and be able to perform all necessary power-up and power-down procedures, including welding equipment; jog the robot in both joint and Cartesian coordinate modes; build and maintain a welding data base; create a program using welding conditions selected from a database, teach a path to include welding and non-welding steps, edit and play back a path in both the single-step and continuous modes of operation.

**Audience:** This course is primarily intended for individuals who operate, program, and maintain the robot on a day-to-day basis, and other candidates who may have the desire to become knowledgeable on the operations and programming of the Kawasaki arc welding robots.

**Prerequisites:** None

**Course Length:** 28 clock hours

**D OR E CONTROLLER ARC WELDING OPERATIONS AND PROGRAMMING COURSE OUTLINE**

- Introduction and Course Registration
- General Robotics
- Safety
- Overview
- Power On/Off Procedures
- Teach Pendant Introduction
- Teaching Program Data
- Testing Program Data
- Executing Program Data
- Editing Program Data
- Weld Data Base Construction and Maintenance
- Teaching Weld Related Program Data
- Testing Weld Program Data
- Editing Weld Program Data
- SLogic & KLogic Programming
- PC Card Operation/Data Management
- AUX Menu Functions
- Final Review and Evaluation

**ROBOTIC GAS METAL ARC WELDING (GMAW -MIG) PRINCIPLES AND APPLICATIONS**

(Course Number CODGMAW)

This course is designed to instruct the student in robotic Gas Metal Arc Welding (GMAW) fundamentals, operating principles, weld process control and optimization strategies. The course addresses key principles, variables and applications universal to the robotic GMAW process. Lecture, demonstration and hands-on exercises are proportioned to effectively introduce and enforce all course material. Course content does not address specific venter equipment, allowing the student to focus and maximize their understanding of key GMAW principles and applications.

**Course Goal:** Upon successful completion of the Robotic Gas Metal Arc Welding (GMAW-MIG) Principles and Applications course, the student should be able to understand and utilize the following:

- Fundamentals, Benefits and Limitations of Robotic GMAW
- GMAW Transfer Modes and Selection Criteria
- Shielding Gas Influence and Selection Criteria
- Welding Parameter Selection, Optimization and Process Control
- Variables Affecting Weld Quality and Robot Downtime
- Principles for Optimizing Robotic Weld Quality and Productivity
- Weld Process Troubleshooting
- General Welding System Maintenance

**Audience:** Personnel responsible or affiliated with the operations of an existing or future robotic welding system, and other candidates who wish to investigate, explore or extend their knowledge base in robotic GMAW welding operations.

**Prerequisites:** None

**Course Length:** 28 clock hours



**ROBOTIC GAS METAL ARC WELDING (GMAW -MIG) PRINCIPLES AND APPLICATIONS COURSE****OUTLINE**

- Introduction
- Course Overview
- Robotic Welding System Overview
- Robotic and GMAW Welding Safety
- Robotic Welding Benefits and General Limitations
- G MAW Fundamentals
- G MAW System Components and Controls
- Introduction to GMAW Transfer Modes
- Short Circuit Transfer Welding Fundamentals
- Short Circuit Transfer Applications
- Process Control Variables, Considerations and Development
- Optimization Principles for Robotic Short Circuit Transfer Processes
- Spray Transfer Welding Fundamentals
- Spray Transfer Applications on Thin Gauge Material
- Spray Transfer Applications on Thick Gauge Material
- Process Control Variables, Considerations and Development
- Optimization Principles for Robotic Spray Transfer Processes
- Pulse Spray Transfer Welding Fundamentals
- Pulse Spray Transfer Applications on Thin Gauge Material
- Pulse Spray Transfer Applications on Thick Gauge Material
- Process Control Variables, Considerations and Development
- Optimization Principles for Robotic Pulse Spray Transfer Processes
- Principles for Optimizing Robotic Weld Quality and Productivity
- Managing Welding Variables Affecting Robot Downtime
- Weld Process Troubleshooting
- General Welding System Maintenance

## D CONTROLLER SERVO SPOT WELD GUN APPLICATION SET UP AND OPERATION

(Course Number CIEASWG)

This course is designed for personnel who are responsible for Kawasaki D controller servo spot weld gun system set up, operation, and maintenance. The course provides information and procedures for hardware and software set up, force calibration, tip wear measurement, deflection compensation, related troubleshooting, and manual/automatic operation. This course consists of approximately 50% classroom presentation and 50% hands-on lab exercises.

**Goal:** Upon successful completion of the D Controller Servo Spot Weld Gun Set Up and Operation course, the student should be able to perform the following:

- Install the servo spot weld gun
- Make all cable connections
- Configure hardware
- Set software parameters
- Perform a software disconnect/connect
- Zero the gun
- Calibrate and check clamping force
- Set deflection parameters
- Create a tip wear measurement program
- Perform manual and automatic operations
- Create a basic spot welding program
- Servo gun troubleshooting

**Audience:** D controller servo spot weld gun system operators and maintenance personnel.

**Prerequisites:** D Controller Operation and Programming

**Course Length:** 28 clock hours

## D CONTROLLER SERVO SPOT WELD GUN APPLICATION SET UP AND OPERATION COURSE

### OUTLINE

- Course Registration
- Introduction
- Course Overview
- Safety
- Servo Spot Gun System Overview
- Servo Gun Installation
- Hardware Configuration
- Software Parameters
- Auxiliary Data Settings
- Software Connect/Disconnect Procedures
- Servo Gun Tool Dimensioning
- Resolution/Exponent Adjustment Procedures
- Servo Gun Zeroing Procedures
- Force/Ampere Calibration Procedures
- Deflection Adjustment
- Teach Mode Gun Operation Efficiencies
- Create Tip Wear Monitoring Programs (Measure 1, 2, and 3)
- Operation and Monitoring of Tip Wear Programs
- Angularity, Gun Positioning, and Programming Techniques for Welding and Tip
- Dress Programs
- Create and Edit a Spot Welding Program
- Related Troubleshooting and Maintenance

## COURSE PRICING

Pricing is per person and includes all materials required for the course and access to necessary equipment. The student is not required to provide any additional materials or equipment.

Course No.	Course Name	Duration	Tuition
CEDCON	D Controller Electrical Maintenance and Troubleshooting	4 days	\$1980
CEECON	E Controller Electrical Maintenance and Troubleshooting	4 days	\$1980
CEEEPCON	E Controller EP Type Electrical Maintenance and Troubleshooting	4 days	\$1980
CETCON	T Controller Electrical Maintenance and Troubleshooting	4 days	\$1980
CIEASWG	D Controller Servo Spot Weld Gun Application Set Up and Operation	4 days	\$1980
CIECON	D or E Controller Robot System integration	4 days	\$1980
COEARCWELD	D or E Controller Arc Welding Operations and Programming	4 days	\$1980
COECONT	D or E Series Controller Operations and Programming	4 days	\$1980
COEGMAW	Robotic Gas Metal Arc Welding (GMAW-MIG) Principles & Applications	4 days	\$1980
COEPECONT	E Series Controller EP Type Operations and Programming	4 days	\$1980
COKLOGIC	KLogic Basic Operation	1 day	\$495
CORECONT	E Series Controller Two-Day Orientation	2 days	\$990
CPECON	AS Language	4 days	\$1980



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KRI-NATC SCHOOL CATALOG

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