

# **AVAILABLE CUSTOMER EARNING COURSES**

## **General**

### **Fundamentals of Electricity for Industry Automation**

**Description** You will learn about the different types and effects of electricity used in daily life. You will learn about the different types of electronic components and how electricity is supplied through them. Finally, you will also learn about switching power supplies that supply electricity to control devices.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

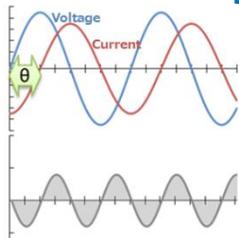
1. Recall the characteristics and the functions of electricity and the relationship between electricity and the products.
2. Link the types of AC power and DC power to their applications in a factory.
3. Recall the cause of electric shock and choose a correct preventive method.
4. Identify the names and the roles of electric components and the direction of the current based on graphic symbols (electric components).

**Audience** This course is intended for those who would like to review the electricity basics and electronic components.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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### **Introduction to FA**

**Description** This course consists of four lessons and will present an introduction to OMRON control components. Through this course, you will learn how many kinds of control components are used in a factory and what are their main functions.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

1. Classify the assigned control component (such as sensors and relays), according to their function in machine or facilities in factory.
2. Demonstrate correct placement of the assigned control component where it is mainly installed in the machines or facilities in the factory.
3. Design correct circuits to make the assigned sequence control circuits (such as AND Circuit, OR Circuit or Self-holding Circuit).
4. Choose a control component based on needs

**Audience** This course is intended for learners who are beginners or new comers in Industrial automation world.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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# Sensors

## Photoelectric Sensors

**Description** This course is intended as a basic course in Omron Photoelectric Sensors, their technology, application, and product lines. In this course you will discover what a photoelectric sensor is, the various types of photoelectric sensors, as well as the different operating modes of photoelectric sensors.

**Objectives** After taking this course, and using all available course material, the learner will correctly:

1. Recall the advantages of photoelectric sensors compared to other sensors.
2. Identify the main features and components of a photoelectric sensor.
3. Be able to explain the 4 basic sensing modes of photoelectric sensors and recall their advantages and disadvantages.
4. List 5 of the most popular Omron photoelectric sensors and their main features.

**Audience** Anyone who is wishing to learn more about the operating principles, operating modes, and application of Omron's Photoelectric Sensor products.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 45 minutes

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## Proximity Sensors

**Description** In this course you will discover:

What a proximity sensor is

The 2 basic types of proximity sensors

Additionally we will explore some basic terms commonly related to proximity sensors. It's imperative that we explore some applications associated with proximity sensors.

Lastly we will look at documentation including websites to find the information you need to be successful.

**Objectives** Upon the completion of this course, and using all available course materials, the learner will be able to correctly...

1. Recall the main advantages of Proximity sensors and examples where they are used.
2. Identify the basic design of an inductive sensor.
3. Explain pros and cons of shielded and non-shielded inductive sensors.
4. Recall the main families of OMRON proximity sensors and their main field of application.

**Audience** This course is intended to give a newcomer the very basics of proximity sensors, a platform to build upon with future courses.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 30 minutes

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## Fiber Optic Sensors

**Description** This course is designed as an introduction or review of basic fiber optic sensors and uses Omron's E3X product line as a prime example of the technology.

Key terminology, operating principles and Omron main products are all covered in this course.

**Objectives** On completion of this course and using all available reference material, the learner will correctly:

1. Choose when to use a fiber sensor over other sensor technologies given a process description or list of application requirements.
2. Match fiber optic sensor terminology to the correct definition including key terms such as power tuning, 2-point-teaching, saturation, total internal reflection, and minimum bend radius.
3. Match product features with the correct product names given a list of E3X amplifiers and sensor heads.
4. Select from a list of available products, the proper amplifier and fiber combination to match a given set of application requirements.

**Audience** Customers, Omron sales partners and those who are interested in learning more about the technology of Fiber Optic Sensors and the Omron E3X Series.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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# Displacement & Measurement Sensors

**Description** In this course you will discover: what is considered to be a Measurement and Displacement sensors. We will look at some features and benefits of these sensors and we will take a look at some applications. Lastly we will look at documentation including websites to find the information you need to be successful.

**Objectives** At the conclusion of the training and using all available course materials, the learner will correctly:

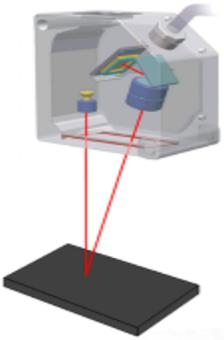
1. Identify industrial applications for Displacement & Measurement Sensors.
2. Recall the main types of OMRON Displacement & Measurement Sensors.
3. Define and explain important terms related to Displacement & Measurement Sensors.
4. Recall most important features and possible applications for OMRON Displacement & Measurement Sensor series ZX2, ZX-GT, ZS-HL and ZG2.

**Audience** This course is intended to give a newcomer the very basics of Measurement and Displacement Sensors, a platform to build upon with future courses.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 45 minutes

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## Vision Basics

**Description** Vision Basics course is an introduction to industrial machine vision and is a pre-requisite to the courses B017 Vision Lighting and B018 Vision Optics.

This course is intended for anyone wanting an overview of vision basic technology and products

It is divided into 4 lessons:

Industrial Vision, Elements of a Vision System, Configuration and Setup of Vision Systems, Omron Vision Sensors and Systems

**Objectives** After completion of the course and using all available reference material, the learner will correctly:

1. Differentiate between the classifications of Vision Systems
2. Identify the components of an Industrial Vision System
3. List the basic steps to setup a vision application
4. Match a selection of vision system features to the Omron Vision System products.

**Audience** Customers, Students, Omron sales partners and those who want to use and learn about vision systems.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 40 minutes

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## Vision Lighting

**Description** This course provides an introduction to industrial lighting systems for vision applications and an overview for OMRON lighting systems. The learner should have basic knowledge about Factory Automation and Basics for Vision Systems before taking this course.

**Objectives** At the conclusion of the training and using all available course materials, the learner will correctly:

1. Identify the purpose of lighting for Vision System Inspections
2. Recognize the main lighting components for industrial applications
3. Identify the illumination factors that will create the best contrast between the inspected object and the background to provide a good inspection image to the vision system
4. Identify how the colors of lights can influence the image quality of the object to be inspected
5. Select the correct type of lighting from a selection of different models to properly solve a particular application
6. Recall most important features and benefits of OMRON lighting systems

**Audience** Customers, Students, Omron sales partners and those who want to use and learn about vision lighting.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 50 minutes

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## Vision Optics

**Description** This course is designed as an introduction to the lens technology and uses Omron's main product line as a prime example.

Key terminology, operating principles and Omron products are all covered in this course.

**Objectives** At the conclusion of the training and using all available course materials, the learner will correctly:

1. Identify the purpose of lens technology for inspection on vision systems
2. Identify the main terms/terminologies and components of lenses
3. Interpret optical charts when selecting lenses
4. Identify and select the correct type of lens from a selection of different models to properly solve a particular application
5. Recall most important features and benefits of OMRON Lenses

**Audience** This course is intended for Technical Professionals and Students as a first exposure to Vision Optics.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 55 minutes

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## E3X-DA-S Fiber Optic Sensor Operation

**Description** In this course, you will learn how to operate the E3X Fiber Optic Sensor. The course B007 Introduction to Fiber Optic Sensors is a pre-requisite to this course and covers fiber optic technology, application, and an overview of the Omron fiber sensor product line.

**Objectives** At the conclusion of the training and using all available course materials, the learner will correctly:

1. Identify the purpose of each display, indicator, switch, and button on a diagram of the E3X front panel.
2. Choose an appropriate fiber head from several choices given the application requirements.
3. Connect and configure the E3X, power supply, and appropriate fiber for operation using the E3X simulator.
4. Initialize the E3X and configure for each of three applications; a transparent object, an opaque object, and a fine line object.
5. Configure at least one optional display mode and optional output mode such as a bar graph display and on-delay for the E3X output.

**Audience** Customers, students, Omron sales partners and those who are interested in learning more about how to operate the E3X fiber optic sensor will find this course interesting and informative.

**Available Languages** Japanese, English, Korean, Indonesian, Thai, Vietnamese

**Recommended Time** 60 minutes

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# E3X-HD Fiber Optic Sensor Operation

**Description** In this course, you will learn how to use the E3X-HD fiber optic sensor after reviewing the optical fiber technology.

**Objectives** On completion of this course, the learner will be able to:

1. Identify the purpose of each display, indicator, and button on a diagram of the E3X-HD front panel.
2. Choose an appropriate fiber head from several choices given the application requirements.
3. Connect and configure the E3X-HD, power supply, and appropriate fiber for operation.
4. Initialize the E3X-HD and configure for each of three applications; a transparent object, an opaque object, and a fine line object.
5. Configure at least one detailed function such as Detection/DPC/Timer function of E3X-HD.
6. Identify the problems when installing several fiber units closely and the benefit of Wire-saving Connectors and Mutual interference prevention function of E3X-HD as the solution.

**Audience** You are recommended to attend the "B007 Fiber Optic Sensors" course and learn about fiber optic sensor technology and its applications, and also get an overview of the Omron fiber sensor product portfolio. This course is intended for people who are interested in knowing how to use E3X fiber optic sensors.

**Available Languages** Japanese, English, Korean, Vietnamese

**Recommended Time** 60 minutes

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## FZ4 Setup and Basic Operation

**Description** The purpose of this course is to teach the learner to setup, startup and basically operate the FZ-4 family of Vision Sensors. The course explains all main product specifications, the benefits of using the FZ-4 for general purpose applications and demonstrate how to perform the following actions:

Setup the hardware for a visual inspection application; Startup the system;

Setup the FZ-4 system configuration (Controller Integrated with LCD);

Demonstrate a basic vision inspection application running with FZ-4;

**Objectives** Using the datasheet, animations, and content of this course, the learner will be able to:

1. Select the best definition for a FZ4 system and their components, given a list of options.
2. Select from a list of tasks, the correct step-by-step to operate/startup the product.
3. Setup the product to correctly inspect and identify failures inside the inspected images, given an application example.
4. Describe the correct meaning for each Input and Output of the system, from a list of options.
5. Identify and explain the main screens of the FZ4 software, given 4 different windows example.
6. Identify the features of a FZ4 system, from a list of Part Numbers.

**Audience** The course is designed for learners who have completed the following courses:

B016 Vision Basics, B017 Vision Lighting, B018 Vision Optics

The course is appropriate for customers, students and Omron sales partners wishing to have a more detailed understanding of FZ-4 operation and who wish to develop the skills needed to use the FZ-4 to solve an application problem.

**Available Languages** Japanese, English, Korean, Indonesian, Thai, Vietnamese

**Recommended Time** 60 minutes

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## FQ-M Operation

**Description** The purpose of this course is to teach the learner to setup, startup and basically operate the FQ-M family of Vision Sensors.

**Objectives** Upon completion of this course, you will become able to:

1. Given application choices, determine if the application can be solved by using FQ-M.
2. Identify two communication networks for FQ-M with External devices, and the correct step required for EtherCAT connection.
3. Select from a list of tasks, the correct step-by-step to operate/startup the product.
4. Set the four inspection items that must be set for an application.
5. Identify the correct steps required for taking a clear image from a list of choices.
6. Match the names with functions of elements of Sysmac Studio Interface.

**Audience** The course is designed for learners who have completed the following courses:

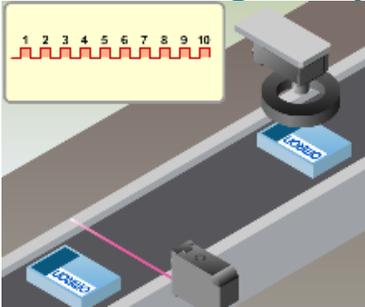
B016 Vision Basics, B017 Vision Lighting, B018 Vision Optics

The course is appropriate for customers, students and Omron sales partners wishing to have a more detailed understanding of FQ-M operation and who wish to develop the skills needed to use the FQ-M to solve an application problem.

**Available Languages** Japanese, English, Korean, Indonesian

**Recommended Time** 50 minutes

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## FH Setup and Operation

**Description** There are two purposes of this course.

The first is to teach the learner to setup, startup, and basically operate the FH system of Vision Sensors.

The second is to teach the details of setup and operation of new functions on the FH system.

**Objectives** By learning the contents included in the course, you will be able to:

1. Select proper applications for specified vision inspection based on understanding the benefits of FH.
2. Select the most appropriate hardware to solve inspection problems utilizing the FH system.
3. Select the appropriate task from the list to create a flow for the inspection programming.
4. Identify issues to enhance the accuracy and speed of the inspection when given a set of sample product images.
5. Select new functions and performance of FH series compared with conventional models, from possible answers.

**Audience** The course is designed for learners who are operating FZ family systems or who expect to operate the FH system in the near future.

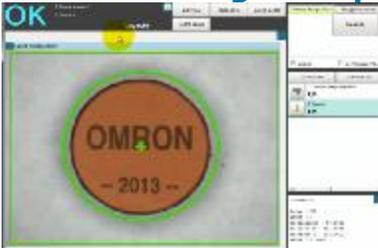
We recommend that the learners take this course after completed the following prerequisite courses:

B016 Vision Basics, B017 Vision Lighting, B018 Vision Optics

**Available Languages** Japanese, English, Korean, Chinese

**Recommended Time** 60 minutes

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# Switches

## 61F "Floatless Level Switch" Basics

**Description** You will understand the operating principles and mechanisms of model 61F and learn the basic knowledge. In addition, you will also be informed of the features for each series of Model 61F and familiarize yourself with the selection methods.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

1. Recognize purpose and basic applications of float-less switches.
2. Select the operating principle and mechanism of sensing liquid level.
3. Recognize the basic system configuration.
4. Choose the terminal connection from possible answers, given circuit diagrams..
5. Choose necessary series of 61F and electrode, given application example.

**Audience** This course is intended for those who have an interest in water level control in general, those who would like to know more about our Model 61F in particular, and new employees of panel manufacturers who will be embedding water level controls for the first time.

**Available Languages** Japanese, English, Indonesian

**Recommended Time** 40 minutes

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# Safety Components

## Introduction to Safety

**Description** This course will cover the basic issues involved in machine safeguarding, provide an overview of the laws and standards, the technologies used, and the products available from Omron.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

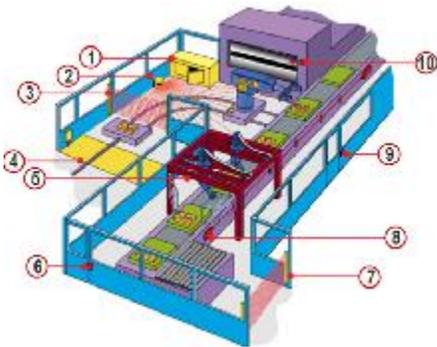
1. Identify machine hazards and where they are found
2. Match the governing standards to the geographic locations
3. Identify the difference between safeguarding responsibility in each country.
4. Identify machine safeguarding technologies and where they are best used.
5. Match the appropriate safety components to the application.

**Audience** The class is designed for beginning students, customers who wish to learn more about safety products or other newcomers to the safety field.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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## Safety Light Curtain Basics

**Description** Safety Light Curtains are one of the most popular devices for guarding machines where operator access is important. Safety light curtains improve productivity and reduce worker fatigue while protecting the worker from the hazards associated with industrial machinery. Learn what makes a light curtain a safety light curtain and how this versatile safeguarding device can fit many applications.

**Objectives** At the completion of this course the learner will be able to:

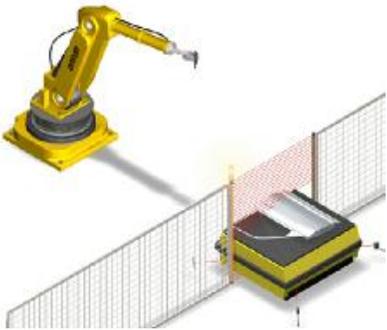
1. Label the main elements of a safety light curtain on a diagram.
2. Be able to properly identify each light curtain feature or function.
3. Be able to identify the different OMRON safety light curtains based on their features.
4. Demonstrate what makes a light curtain a safety light curtain.
5. Choose the correct light curtain for an application.

**Audience** All learners who need to understand where safety light curtains are applied and the features of the Omron Product line

**Available Languages** Japanese, English, Korean, Indonesian, Thai, Vietnamese

**Recommended Time** 60 minutes

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## Safety Interlock Switch Basics

**Description** Safety interlock switches are the backbone of the safety product offering because, while they may not be as flashy as light curtains or scanners, approximately 80% of all safety applications involve door guarding. In this course we will discover what makes a switch a safety switch, where they are used, and what product offering OMRON STI has available

**Objectives** After completing this course the participant will be able to correctly:

1. Identify the elements that make a switch a safety switch.
2. Be able to select the correct definition of switch specific terms.
3. Select a switch based on a list of its characteristics.
4. Select the proper switch from a list based on a defined application.

**Audience** This course is designed for Omron and distributor salespeople who want a basic understanding of interlock switches.

**Available Languages** Japanese, English, Indonesian

**Recommended Time** 60 minutes

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# Sysmac Studio Operation-with the NX Series Safety Control Unit

**Description** You can create a program for "Emergency stop", which is a basic safety circuit, by using Sysmac Studio.

**Objectives** Considering the information presented in this course and the available resource material, learners will correctly:

1. Select correct methods to create safety programs with Sysmac Studio.
2. Select the required operations for configuration and setup for the NX Series Safety.
3. Control Unit using Sysmac Studio.
4. Recognize required operations before executing a safety program.
5. Given a list of commissioning procedures, place the procedure in a recommended sequence.

**Audience** This course is designed for those learning to operate Sysmac Studio the first time.

Some basic understanding of Omron controllers is a prerequisite for this course.

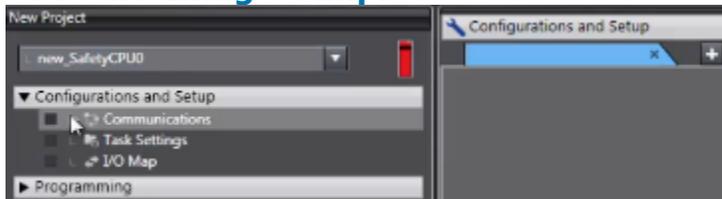
It is recommended that you have attended the following course.

- For basic knowledge for the Sysmac Studio Operation: C029 Sysmac Studio Operation
- For basic information on safety control: A019/A063 Introduction to Safety
- For basic information on the NX Series: B028 NJ Series Basics (Lesson 5).

**Available Languages** Japanese, English, Korean

**Recommended Time** 40 minutes

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# Relays

## General Purpose Relays

**Description** The lessons in this course cover:

Function and Uses of Relays

EMR Product Technology, Parts 1 and 2

Relay Configurations

Omron Electromechanical Relay Product Line

**Objectives** Upon the completion of this course and using all available reference materials, the learner will correctly:

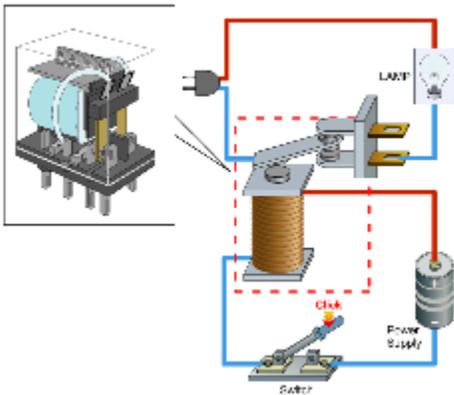
1. Recognize the definition of an electromechanical relay, and identify at least 3 possible functions a relay can perform.
2. Match both devices and characteristics to the proper type of load.
3. Identify the causes and effects of contact wear, and methods used to extend contact life and relay endurance.
4. Match the product name to its purpose or feature for at least 4 products in Omron's electromechanical relay product line.
5. Use a max switching chart to determine maximum switching current.
6. Estimate relay endurance given set of operational conditions and a relay endurance chart.

**Audience** This technology level course is for novice or beginner level technicians, or engineers who need to possess a greater knowledge of Electro Mechanical Relays, or customers wishing to learn more about EMR technology.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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# Control Components

## Temperature Controllers

**Description** In this course, we will introduce how temperature control works and some basic functions of the Temperature Controller. It will also discuss examples of required configuration for temperature control, and product range and sample applications for Omron Temperature Controllers.

**Objectives** Upon completion of this course, the learner will be able to:

1. Recognize the proper definitions of Set Point(SP), Process Value(PV), and Manipulated Value(MV) as they relate to temperature control.
2. Recognize the difference between sequence control and feedback control.
3. Recognize the difference between ON/OFF control and PID control as it relates to temperature control.
4. Identify necessary devices to configure a temperature control application.
5. Identify characteristics of four types of input sensors and two types of controller outputs.
6. Identify several key features of the E5CC temperature controller.

**Audience** This course is intended for people who want to learn about the basic mechanism of temperature control with having completed "Introduction to FA (Factory Automation)" or equivalent knowledge.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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## E5CC Temperature Controller Operation

**Description** The E5CC Basic Operation course describes the physical setup, configuration, control operation, and programming of the Omron E5CC Temperature Controller.

**Objectives** After completing this course, and using all available resource materials, the learner will correctly:

1. Identify the purpose of each front panel display and Key on the E5CC temperature controller.
2. Choose the most appropriate sensing device given the application parameters and identify proper wiring connections to the E5CC.
3. Confirm parameters and values to configure the E5CC to maintain water temperature with an electric heater and J type thermocouple in a simulated application environment.
4. Select parameters and values to configure the E5CC for a set point limit, absolute HI temperature alarm limit, and to protect the parameters and set point against unauthorized changes.
5. Observe the E5CC react to a temperature upset in a simulated application environment and correctly answer questions about improving its performance.

**Audience** The course should be of interest to students, machine builders, engineers, and others wanting to study E5CC operation in typical temperature control application.

**Available Languages** Japanese, English, Korean, Indonesian, Vietnamese

**Recommended Time** 60 minutes

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# Industrial Timers

**Description** This course provides basic knowledge about OMRON Industrial Timers.

**Objectives** Upon completion of this course, the learner will be able to correctly:

1. Recognize the operation mechanism of timer, and identify at least 4 operating modes and timer start methods.
2. Select from a list information that would be important to know when selecting a timer.
3. Recognize the features of the digital timer model H5CX and the connection method with input/output equipment, as well as the setting methods using DIP switches.
4. Identify the differences between a timer and a time switch, the differences between an analog timer and a digital timer, and applications they are used in.
5. Select a suitable timer model if the necessary information is given to choose.
6. Recall Omron's robust product range of timers and time switches support a variety of needs with various sizes, setting methods, and additional functions.

**Audience** All for the beginner of Industrial Timers; Customer, Omron sales partners

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 50 minutes

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## H5CX Operation

**Description** Brief digital timer review, input connections, operation procedure and additional functions are covered in this course.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

1. Select the correct diagram of input connection and NPN/PNP input mode for a given input device.
2. Identify the purpose of each front panel display, operation key, and DIP switch.
3. Choose the correct product configuration and output mode for a given application.
4. Select the correct step-by-step procedure in order to use the H5CX as needed.
5. Make the DIP switch settings for basic functions according to the use conditions of H5CX with reference to the datasheet.
6. Choose the proper key sequence to make a requested setting change using the operation keys.
7. Associate the appropriate special functions with their proper explanations, timing charts, or application examples.

**Audience** This course is designed for beginners or newcomers to Omron H5CX Digital Timer.

For beginners to industrial timers, we recommend completing the "B013 Industrial Timers" course before signing up for this course.

**Available Languages** Japanese, English, Korean, Indonesian, Thai

**Recommended Time** 50 minutes

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# Industrial Counters

**Description** This course provides a basic knowledge about OMRON Industrial Counters.

**Objectives** Upon completion of this course, the learner will be able to correctly:

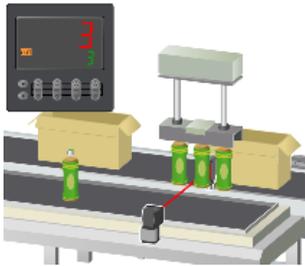
1. Recognize the operation mechanism of a counter, reset method, input modes, and at least 3 output modes.
2. Select from a list information that would be important to know when selecting a counter, such as Counting Speed.
3. Recognize the features of the preset counter model H7CX, the connection method with input/output equipment and other counter functions, as well as the setting method using DIP switches.
4. Identify the differences between a totalizer and a preset counter, and applications they are used in.
5. Recall Omron robust product range of preset counters and totalizers that support a variety of needs with various sizes, setting methods, and additional functions.

**Audience** All for the beginner of Industrial Counters; Customer, Omron sales partners

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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## H7CX Operation

**Description** Preset counter review, input connections, operation procedure and additional functions are covered in this course.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

1. Select the correct diagram of input connection, input terminals, NPN/PNP input mode, and counting speed for a given input device.
2. Identify the purpose of each front panel display, operation key, and DIP switch.
3. Choose the correct product configuration and output mode for a given application.
4. Select the correct step-by-step procedure in order to use the H7CX as needed.
5. Make the DIP switch settings for basic functions according to the use conditions of H7CX with reference to the datasheet.
6. Choose the proper key sequence and settings to set a pre-scale value using the operation keys for a given application.
7. Associate the appropriate special functions with their proper explanations, timing charts, or application examples.

**Audience** For beginners to industrial counters, we recommend completing the "B014 Industrial Counters" course before signing up for this course.

**Available Languages** Japanese, English, Korean, Indonesian

**Recommended Time** 60 minutes

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## K3HB Operation

**Description** Focus on how to operate and program the K3HB Panel Meter

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

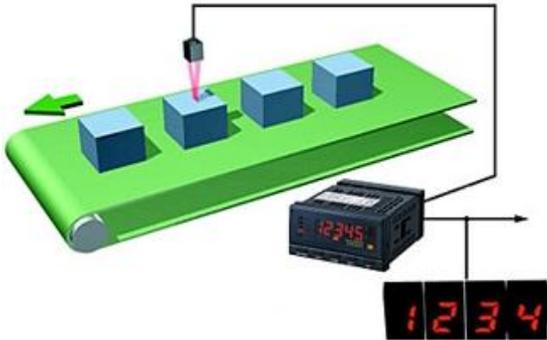
1. Select the answer to questions regarding the installation and wiring of the K3HB panel meters.
2. Identify K3HB panel meter components and their functions.
3. Select the answer to questions regarding programming of the K3HB panel meters

**Audience** Beginners to Panel Meters

**Available Languages** Japanese, English, Korean, Indonesian

**Recommended Time** 60 minutes

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# Automation Systems

## Programmable Controller Basics

**Description** This course provides very basic knowledge about OMRON PLCs.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

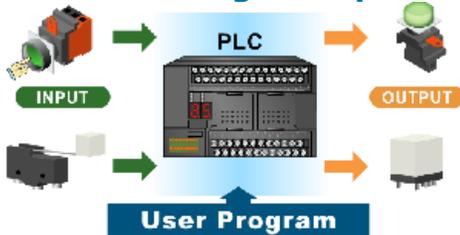
1. Choose the correct definition of PLC from three possible definitions.
2. Recognize programmable operation, as an advantage over hard wired sequential circuits.
3. Recall the configuration of PLCs consisting of Input Unit, Output Unit, and CPU.
4. Identify on a diagram, two kinds of memory blocks that are used internally in every PLC.
5. Select suitable PLC type from Compact or Modular if the necessary information is given to choose.

**Audience** All for the beginner of PLCs; Customer, Omron sales partners

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 50 minutes

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## Ladder Programming Basics (I/O control)

**Description** This course is divided into the following two lessons:

Lesson 1: Basic Rules of Ladder Programming

Lesson 2: Basic Circuits

**Objectives** The learner will correctly

1. Recognize the basic rules for creating ladder programs and the symbols used in ladder diagrams.
2. Recognize how AND, OR, self-holding, and interlock gates operate.
3. Recognize how self-holding circuits operate and recognize correct examples of these circuits.
4. Recognize how the Work Area operates and recognize correct examples of self-holding circuits that use the Work Area.
5. Recognize examples of self-holding and interlock circuits applications.

**Audience** This course was designed for those who want to learn the basics on circuits and how to create ladder programs. We recommend that you take the following eLearning courses about Omron programmable controllers before taking this course.

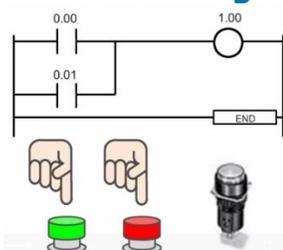
B010 Programmable Controller Basics, C011 Micro Controller Set-up and Operation(CP1 Series), or

C039 Programmable Controller Set-up and Operation(CJ2 Series)

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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## Ladder Programming Basics (Special Instruction)

**Description** This course is divided into the following three lessons:

Lesson 1 Basic Knowledge for Ladder Programming

Lesson 2 Common Instructions

Lesson 3 Exercise

**Objectives** The learner will be able to correctly:

1. Understand the rules of ladder programming on OMRON Programmable Logic Controllers.
2. Create programs combining basic circuits to perform the provided requirement specifications.
3. Understand requirement specifications and select correct instructions to perform the operation.
4. Figure out operations from ladder programs consist of basic circuits and instructions.

**Audience** This course is designed for those who want to learn the basic circuits of ladder programs and common instructions.

**Available Languages** Japanese

**Recommended Time** 90 minutes

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## Micro Controller Set-up and Operation - CP1 series

**Description** In this course, we will learn about the prerequisites for programming, such as the CP1 series' features and product range, hardware specifications, and software configurations.

**Objectives** After completion of this course, the learner will be able to correctly:

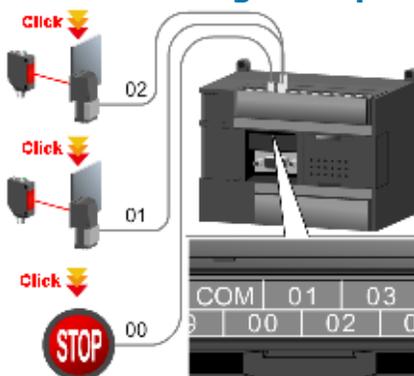
1. Choose the features of CP1 series.
2. Select the right CP1 for your application.
3. Recognize the considerations for wiring of the input/output equipment.
4. Describe the memory areas of the CP1.
5. Recall the software functions and procedures required for set up CP1.

**Audience** This course is designed for beginners or newcomers to microcontrollers (CP1s).

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 50 minutes

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## Programmable Controller Set-up and Operation - CJ2 series

**Description** In this course, we will learn about the prerequisites for programming, such as the CJ2 series' product portfolio, hardware configuration and wiring, and software settings.

**Objectives** After completion of this course, the learner will be able to correctly:

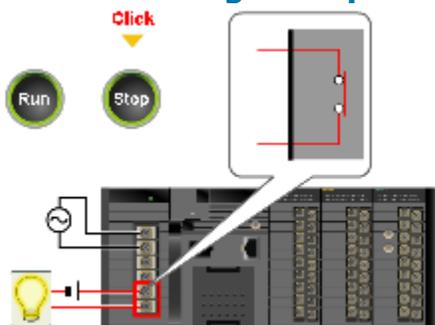
1. Select CJ2 series units required for basic system configuration.
2. Choose the correct wiring diagrams while viewing the various wiring diagrams of controllers and the input/output devices.
3. Identify the address allocation of the CJ2 series while viewing a configuration diagram of the unit.
4. Select the special I/O unit or CPU BUS Unit in accordance with the function required.
5. Choose the way in which the IO table is created to detect improper unit connection when the unit mounting position has been changed.
6. Recall the CX-Programmer function required for using the special unit while viewing the CX-Programmer screen.

**Audience** This course is designed for beginners to the CJ2 series.

**Available Languages** Japanese, English, Korean, Indonesian

**Recommended Time** 50 minutes

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## Introduction to Sysmac Automation Platform

**Description** The following contents are offered:

Overview of the Sysmac brand  
NJ Series Machine Automation Controller  
EtherCAT - Machine Network  
Sysmac Studio - ONE software

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

1. Recognize the new Sysmac brand concept.
2. Describe the differences between NJ and PLC.
3. Describe the differences between Sysmac Studio and CX-ONE.
4. Identify the benefits by using the NJ and the NX-SNC.

**Audience** This course is designed for beginners concerned in building the safety of machinery who have basic knowledge of the Programmable Logic Controllers and safety.

**Available Languages** Japanese, English, Korean

**Recommended Time** 40 minutes

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## NJ Series Basics

**Description** This course is designed for people with knowledge of both programmable controllers and safety and want to get knowledge of impact to machine control systems by using the NJ and the NX series for the first time in machine control.

you can learn the features of the NJ series, the basic software knowledge necessary for programming, an overview of the motion control, and the compatibility with the touch panel NS series.

(If you want to learn how to operate Sysmac Studio and the details knowledge of the motion control, take an upper-level course.)

We advise you to take the courses below to get basic knowledge of safety before taking this course.

A019/A063: Introduction to Safety, B025: Safety Light Curtain Basics

**Objectives** After completion of this course, the learner will be able to correctly:

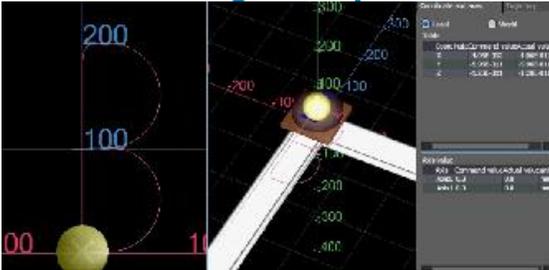
1. Choose the features of the NJ series.
2. Choose the features of NJ-series variable programming.
3. Recognize the NJ series task and POU's function.
4. Choose the features of the NJ-series motion control.
5. Recognize hardware system and software to operate the NX Series.
6. Choose the merits in connecting the NJ series to the NS series.

**Audience** This course is aimed at anyone who is learning about the machine automation controller the NJ series and the NX series for the first time.

**Available Languages** Japanese, English, Korean

**Recommended Time** 60 minutes

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## Introductory course of IEC 61131-3

**Description** This course is an introductory course for learning the international standard IEC 61131-3 for PLCs (Programmable Logic Controllers) established by IEC (International Electrotechnical Commission).

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

1. Identify the intent of IEC 61131-3 establishment.
2. Identify the PLCopen® organization and the activities which PLCopen® is promoting.
3. Select suitable language from 5(Five) languages defined by IEC 61131-3 when an application is provided, based on understanding of the language outline.
4. Identify the concept of modularization/ re-use programming by POU (Program Organization Unit) and how to assign POU to task defined by IEC 61131-3.
5. Identify the rule of variable programming defined by IEC 61131-3.

**Audience** After completing this course, we recommend that you take the following related courses:

B046 IEC IEC 61131-3 Compliant ST Language Basics, B028 NJ Series Basics

**Available Languages** Japanese, English, Korean

**Recommended Time** 45 minutes

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## IEC 61131-3 Compliant ST Language Basics

**Description** This course is designed for beginners in the ST language, helping them learn the basic grammar and create simple programs by using the functions and grammar of the ST language.

**Objectives** Upon completion of this course, based on the information provided by the course, the learner will become able to:

1. Distinguish between the strengths and weaknesses of the ST language.
2. Understand the basic way (grammar) of writing programs using the ST language.
3. Write programs using arithmetic expressions such as addition and subtraction in the ST language.
4. Write simple string processing programs in the ST language.
5. Write control statement programs such as IF and Case in the ST language.

**Audience** You are recommended to attend in advance Lesson 2 Software Environment in the "A064 Introductory course of IEC 61131-3" course

**Available Languages** Japanese, English, Korean

**Recommended Time** 40 minutes

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```
Str1 := LEN('123456789ABC');
```



12 will be returned to Str1

## Sysmac Studio Operation

**Description** This course provides you with the knowhow to create basic programs and to debug using Sysmac Studio.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

1. Select the correct features of Sysmac Studio from possible answers
2. Recall how to use Sysmac Studio to correctly set up the NJ system, including the connection to EtherCAT I/O slaves.
3. Recognize the procedure to create the I/O map and variables when programming the NJ.
4. Choose the correct procedures to program Ladder/ST programming, and the operation to synchronize.
5. Match the names of functions for debugging to the usage examples.

**Audience** This course is designed for those learning to operate Sysmac Studio the first time.

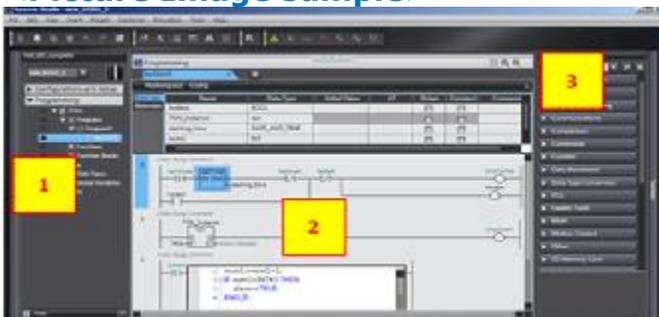
Some basic understanding of Omron controllers is a prerequisite for this course.

It is recommended that you have attended the "A027 Introduction of Sysmac Automation Platform" course and the "B028 NJ Series Basics" course in advance before signing up for this course.

**Available Languages** Japanese, English, Korean, Indonesian, Thai

**Recommended Time** 60 minutes

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# Sysmac Studio Operation (ST Program)

**Description** This course is intended to teach the procedure of developing and debugging ST programs in various styles (Programs, Functions, Function Blocks, and In-line STs).

**Objectives** Upon completion of this course and grasping its contents, the learner will be able to apply Sysmac Studio to accomplish the following tasks:

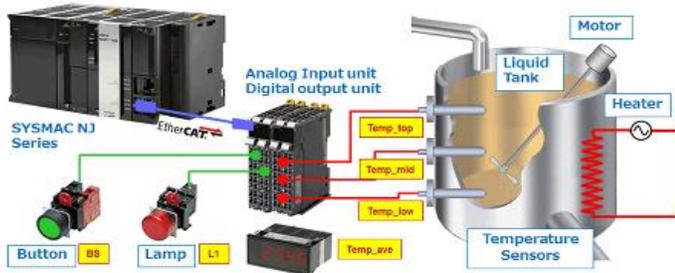
1. Create in-line ST that use four arithmetic operations and functions.
2. Create in-line ST that use control syntax.
3. Create functions written in ST, and then call them from a ladder program.
4. Debug programs that use functions created as above.
5. Create programs that use ST instructions.

**Audience** This course assumes learners have completed the "A064 PLCopen® Certification Course Introduction of IEC 61131-3" and "B046 IEC Compliant ST Language Basics" courses or those with equivalent knowledge.

**Available Languages** Japanese, English, Korean

**Recommended Time** 50 minutes

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# Introduction to FA Open Networks

**Description** This course is divided into the following three lessons:

Lesson 1: Welcome to FA Open Networks

Lesson 2: What is Industrial Ethernet?

Lesson 2: Omron Industrial Ethernet Products

**Objectives** Upon completion of this course , the learner will correctly:

1. Identify what kinds of technologies and products are available when you consider the implementation of open networks based on the knowledge of the history behind the emergence of open networks and the benefits of using open networks.
2. Identify the benefits and issues of Industrial Ethernet when you consider the implementation of open networks based on the knowledge of the history of emergence and specifications of industrial Ethernet technologies / standards.
3. Recognize the network product names and the benefits of the Omron industrial Ethernet products that Omron's new automation controller Sysmac NJ/NX series support when you consider the implementation of open networks.

**Audience** This course is intended to aid those considering the implementation of open network technologies and products in industrial environments to select the most appropriate products for their environment. No prerequisite knowledge is required for this course.

**Available Languages** Japanese, English

**Recommended Time** 40 minutes

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## FA Networks Basics

**Description** This course is divided into 4 lessons, and provides basic knowledge of FA Network. And also introduce product features and user benefits of Omron's FA network product. It will take about one hour to complete this course.

**Objectives** Upon completion of this course, the learner will be able to:

1. Understand the basic terminologies, and the reason why the network open trend became popular.
2. Recognize the purpose of using an FA network and where it is used.
3. Explain hierarchy concept of the FA network and the typical applications.
4. Select Omron's FA network product for each FA network layer.

**Audience** This course is designed for beginners or newcomers for starting FA networks.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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## EtherNet/IP™ Basics

**Description** This course is designed to provide an introduction to the EtherNet/IP network, including specifications, configuration, and implementation.

**Objectives** Upon completion of this course, the learner will be able to correctly:

1. Recall the function and performance characteristics of EtherNet/IP.
2. Identify how certain Omron controllers utilize the functions and performance of EtherNet/IP.
3. Given the Sysmac Studio programming tool, correctly configure the order of operational flow for an Omron system using EtherNet/IP.
4. Correctly choose from a given list the Omron products which support EtherNet/IP communications.

**Audience** This course is designed to provide an introduction to the EtherNet/IP network, including specifications, configuration, and implementation.

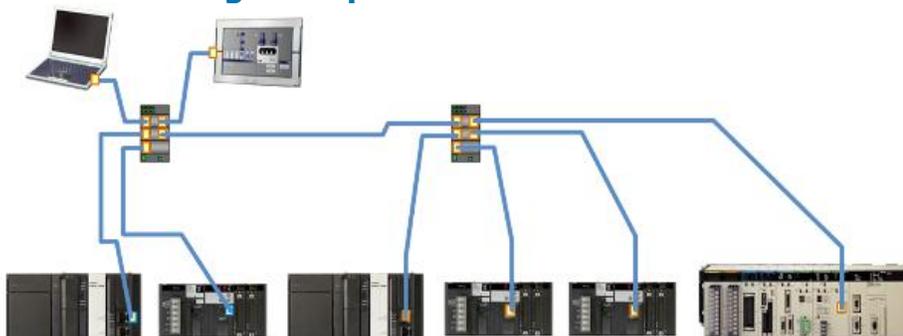
Before completing this course, it is strongly advised to complete the online course listed below.

- A069 - Introduction to Industrial Networks
- B028 - NJ Basics

**Available Languages** Japanese, English

**Recommended Time** 60 minutes

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# EtherCAT Basics

**Description** This course is divided into the following three lessons:

Lesson 1: Introduction to EtherCAT

Lesson 2: Omron EtherCAT Products

Lesson 3: Sysmac Studio Configuration Example

**Objectives** The learner will be able to correctly:

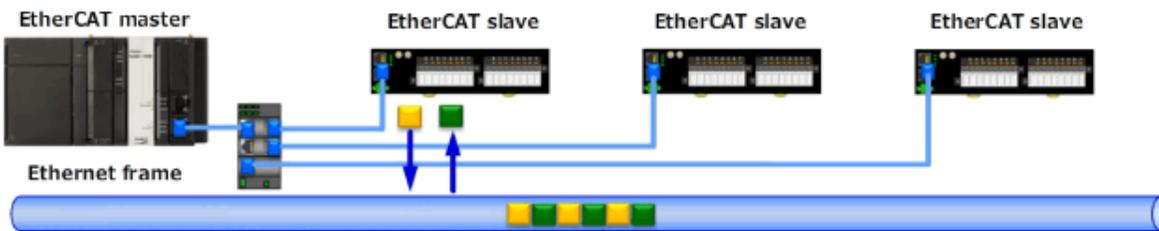
1. Classify the assigned control component (such as sensors and relays), according to their function in machine or facilities in factory.
2. Demonstrate correct placement of the assigned control component where it is mainly installed in the machines or facilities in the factory.
3. Design correct circuits to make the assigned sequence control circuits (such as AND Circuit, OR Circuit or Self-holding Circuit).
4. Choose a control component based on needs.

**Audience** This course is intended to educate individuals, who have basic knowledge of communications technologies, on the fundamentals of EtherCAT networks and Omron's EtherCAT products.

**Available Languages** Japanese, English

**Recommended Time** 60 minutes

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# NB Setup and Basic Operation

**Description** In this course on the NB series devices, we will learn about their features, preparation required for their launch, screen design method, and connection method with a PLC.

**Objectives** Considering the information presented in this course and the available resource material, the learner will be able to correctly:

1. Recall the functions and features of NB.
2. Choose hardware and software required for launching NB.
3. Select the component from the list in order to create screens using NB-Designer.
4. Recall the operations to transfer screen data and system settings.
5. Recall the setting in order to establish a communication between NB and CP1.

**Audience** This course is designed for those who want to learn about the functions and features of NB and the method for introducing it into their respective workplaces.

As a prerequisite, it is recommended that you should have completed the e-learning course of "Micro Controller Setup and Operation" before signing up for this course.

**Available Languages** Japanese, English, Korean, Indonesian, Thai, Vietnamese

**Recommended Time** 60 minutes

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## NA Basic Operation

**Description** This course is intended for beginners to OMRON's HMI: NA series products.

**Objectives** Using the information contained in this course, the learner will correctly:

1. Order the operation flow for creation of NA screen with Sysmac Studio.
2. Confirm the correct parameters and the setting operation with Sysmac Studio to create the basic parts of NA screen. (Label, ON/OFF switch, Bit Lamp, Command Button: Changing Screen, Display & Input numerical value, Alarm)
3. Select the operation and the correct order for transferring the screen data and system parameters to NA.
4. Identify the setting operation to establish communication between NA and NJ.

**Audience** After first gaining an overview of the NA series, you will learn the basic settings for using the NA series and the operations for creating very basic screens.

For those unfamiliar with the Sysmac series, we recommend completing the following courses before starting with this course.

B027 Introduction to Sysmac Automation Platform, B028 NJ Series Basics, C029 Sysmac Studio Operation

**Available Languages** Japanese, English

**Recommended Time** 50 minutes

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## RFID Basics

**Description** This course introduces first-time learners of RFID systems to the applications, principles and features of RFID. It also allows the learners to get familiarized with the Omron product portfolio.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

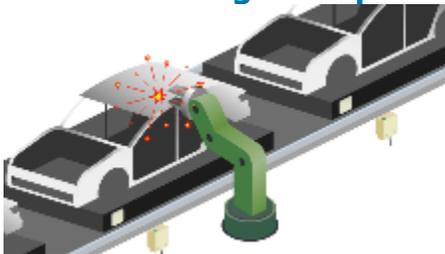
1. Recognize a need to manage manufacturing information in Factory Automation.
2. Choose the correct definition of RFID from possible answers.
3. Recall required equipment and equipment capability to realize an OMRON RFID system from a list of possible components.
4. Distinguish the features between RFID and barcodes/two-dimensional code on the basis of the course materials.
5. Select suitable OMRON's RFID series by the differences in detection distance and the application.

**Audience** This course is intended for those who have attended "A009 Introduction to FA (Factory Automation)" and "B010 Programmable Controller Basics".

**Available Languages** Japanese, English, Korean, Indonesian

**Recommended Time** 60 minutes

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# Motion/Drives

## AC Drives Basics

**Description** The goal is to make the learner familiar with AC Drives terminology and explain the purpose of the various types of AC Drives.

**Objectives** At the conclusion of this course, the learner will be able to properly perform the following skills:

1. Identify the components and accessories of AC DRIVES and motors.
2. Select the proper AC DRIVE basic type for a specific application.
3. Recognize words, phrases, and terminology used to describe the operation of AC DRIVES and motors

**Audience** The course is intended for anyone who needs a first exposure to Omron AC Drives products.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 45 minutes

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## Basic Motion Control

**Description** The course will cover such topics as:

1. Basic control technology, hardware, and terminology
2. Configuration and components of a motion control system
3. A survey of common applications requiring motion control
4. An overview of Omron motion control products

**Objectives** At the conclusion of this course, and using all available reference material, the learner will correctly:

1. Match the motion control terminology or component to its definition or function.
2. Identify the function of all six parts of a motion control system.
3. Recognize the difference between a Servo motor and an AC motor.
4. Identify key motion data from a description of a factory automated process.
5. Match the control function to an Omron product name.
6. Identify two software support packages for Omron motion control products.

**Audience** This is a product technology level course in basic motion control. It is intended for anyone wishing to learn more about factory motion control.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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## Servo Basics

**Description** This basic technology eLearning course is designed to introduce the learner to the basic concepts of servo motor operation, construction, performance, and products.

**Objectives** At the conclusion of the course and using all available resource material, the learner will correctly:

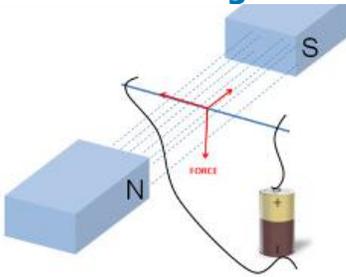
1. Describe the role of servo components in a motion control system.
2. Define a selection of basic servo and servo drive terminology.
3. Identify the component parts and operating principles of motors, servo motors, and servo drives.
4. Select, from a list of basic factors, those affecting choice of servo, servo size, and servo tuning.
5. Match Omron product line examples with their important characteristics.

**Audience** This course is designed for anyone wanting a better understanding of servo motors and the Omron portfolio of servo motors and servo drive products. As a prerequisite, it is recommended you complete B008 Motion Control Basics before taking this course on Servo Basics. It covers the principles of basic motion control of which servo motors play a critical role and offers many examples of motion applications in industry.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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## NJ Operation Machine Control

**Description** The lessons in this course cover: NJ Configuration and Setup Program Organization Units (POU) NJ Variables Axes Group Configuration Basic Motion Programming

**Objectives** At the conclusion of the course, the learner will correctly:

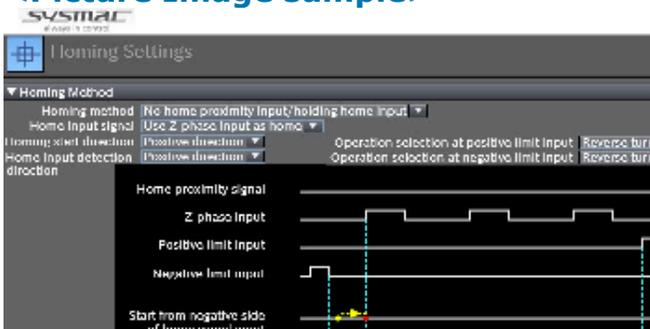
1. The learner will properly configure the NJ Hardware, including Communication networks which may include other Omron or third party devices.
2. The learner will organize Program Organization Units into Tasks which will maximize the performance of the NJ MAC system.
3. The learner will evaluate which system Motion Variables shall be used to create the most efficient project.
4. The learner will properly create Axis Groups which will be required for advanced functions, such as moving multiple axes along a path.
5. The learner will properly utilize the motion function block library to develop motion programs in Ladder Diagram and Structured Text.

**Audience** This course is for novice or beginner level technicians, engineers, or customers who need to possess a basic knowledge on the programming and configuration of the NJ Machine Automation Controller (MAC).

**Available Languages** Japanese, English, Korean, Indonesian, Thai

**Recommended Time** 60 minutes

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# Energy Conservation Support / Environment Measure Equipment

## Energy Saving Basics

**Description** In this course, we will learn about the approaches for specifically implementing energy saving, as well as about the basics of energy saving at factories.

**Objectives** Considering the information presented in this course and the available resource material, the learner will correctly:

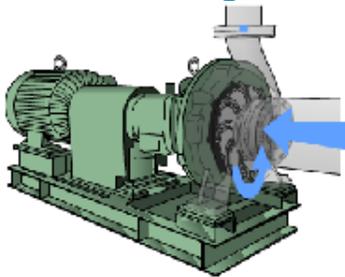
1. Recall the forms of energy used at factories.
2. Recognize the steps for taking the initiative to reduce energy consumption.
3. Recognize the benefit by detecting waste from visualized data.
4. Choose the features of Omron's product for energy saving from possible answers.

**Audience** This course is designed for those who are in a position to implement/promote "energy saving on the manufacturing floor".

**Available Languages** Japanese, English, Korean, Indonesian, Thai, Vietnamese

**Recommended Time** 45 minutes

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## Power Supplies

### Power Supplies

**Description** This course consists of three modules and will present an introduction to basic power supplies, then focus specifically on the S8VS power supply products. The course is intended for anyone who needs a first exposure to Omron power supply products. There are no pre-requisites or pre-assessments necessary before taking this course.

**Objectives** After completing this course, you will be able to correctly:

1. Distinguish the difference between AC and DC voltage.
2. Evaluate a situation to determine if a power supply is needed.
3. Match parts of a power supply to the functions they perform.

**Audience** This course is designed to assist technicians, engineers, and customers in understanding the basic principles of temperature control.

**Available Languages** Japanese, English, Korean, Chinese, Indonesian, Thai, Vietnamese, French, Portuguese, Spanish, German, Italian, Russian

**Recommended Time** 60 minutes

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