

Smart Device Experimentation Package



ALLEN-BRADLEY COMPACTLOGIX PLC KIT LAB ACTIVITY GUIDE

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INDUSTRY 4.0

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Intelitek software and documentation are available at <http://intelitekdownloads.com>.

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1. Getting Started

1.1. OVERVIEW

Thank you for purchasing the Intelitek *Smart Sensor Experimentation Package* for use in your classroom or laboratory. IO-Link is a communication protocol common to industrial automation systems, and the *Smart Sensor Experimentation Package* is meant to provide a scaled down IO-Link system that is usable in an educational setting, while still providing users with authentic, industry-recognized hardware and software.

This guide is meant to help you get started with the laboratory curriculum and provide you with access to the various lab activities.

1.2. INTEGRATING JMETS

The lab activities in this package require access to a JobMaster Training System (JMETS) and its accompanying components.

For more information about the JMETS, its setup, and its accessory components, visit <https://www.intelitekdownloads.com/Manuals/IndustrialMaint/> and download the relevant user guides.



An IO-Link master device mounted onto the JMETS

1.3. PREREQUISITES

Participants must complete both the *Proximity and Distance Kit* lab activities and *Identification Kit* lab activities before participating in the CompactLogix PLC lab activities.

It is highly recommended that you complete Intelitek's Level 1 and Level 2 Industry 4.0 courses before performing these lab activities, as well as have a basic knowledge of PLCs and how to operate the Studio 5000 software. To learn more about these subjects, enroll in [Intelitek's PLC Technology Training](#) courses.

1.4. WHERE ARE THE LAB ACTIVITIES?

You can find a list of lab activities in Section 4, List of Lab Activities, on page 8. All lab activities are available on downloadable and printable PDF documents.

2. Materials

Materials required for each lab activity are listed at the beginning of each activity. Ensure that all materials are ready before the beginning of each lab period.

Provided Materials

Part	Part No.	Package	Req. Amt.
IO-Link Master AL1320	410496	Proximity & Distance	1
230V/24V IO-Link Power Supply	430755	Proximity & Distance	1
IO-Link Master Power Cable with Banana Connection	040513	Proximity & Distance	1
M12-RJ45 Ethernet Cable	410492	Proximity & Distance	1
IO-Link M12-M12 Connection Cable	410493	Proximity & Distance	4
Inductive Sensor	035101	Proximity & Distance	1
Ultrasonic Sensor	035102	Proximity & Distance	1
Photoelectric Sensor	035103	Proximity & Distance	1
Steel Plate	110650	Proximity & Distance	1
Brass Rod	112872	Proximity & Distance	1
Marked Aluminum Cylinder	112713	Proximity & Distance	1
Blue Block	113023	Proximity & Distance	1
Plexiglass Block	113034	Proximity & Distance	1
Magnet	410404	Proximity & Distance	1
Stack Light	035106	Identification	1
RFID Read/Write Head	035104	Identification	1
Smart RFID Tag	410489	Identification	20
JMTS Mounting Panel	00-1300-0003	JMTS/PLC	1
Power Supply Module with Power Cable	10-2550-1000	JMTS/PLC	1
JMTS CompactLogix PLC Module	10-2550-7000	JMTS/PLC	1
JMTS PanelView HMI Module	10-2550-8000	JMTS/PLC	1
Electrical Connectors (Banana Cables)	4116XX	JMTS/PLC	4

Additional Required Materials

Part	Amount
Wrench	1
Computer	1
Ethernet Switch	1
Ruler	1

Required Software

Package
LR Device
Ethernet Configuration Tool (Hilscher)
Studio 5000 Suite: Mini package or higher

Intelitek software and documentation are available at <http://intelitekdownloads.com>.

3. Navigating the Lab Activities

3.1. OVERVIEW AND PREPARATION

3.1.1. General Preparation

Lab activities include tasks that must be performed using the IO-Link smart devices.

Participants are assigned with reading the lab activity PDFs (see Section 4, List of Lab Activities, below) and performing the tasks. Both participants and instructors are encouraged to read through the activities ahead of each lab period as preparation.

All activities require instructor verification to ensure that the work of the participants meet the requirements in the performance objectives. Performance objectives are listed at the beginning of each lab activity.

3.1.2. Software Installation

The Studio 5000 application suite is required in order to complete the lab activities. Ensure that Studio 5000 is installed before beginning the lab activities.

3.1.3. CompactLogix Controller and IO-Link Master IP Addresses

The CompactLogix Controller requires a static IP address on the same subnet as the computer to be able to communicate with it. Refer to the CompactLogix 5000 documentation to configure a static IP address.

The IO-Link Master also requires a static IP address on the subnet. The IP address can be configured using the Hilscher Ethernet Device Configuration tool.

3.1.4. IO-Link Master EDS File

Participants in this package's lab activities will be required to add the AL1320 IO-Link master to their Studio 5000 Logix Designer projects. In order for the AL1320 master to be available in the list of modules that can be added to a project, the relevant .eds file must be installed. See the appendix in the first lab activity (*Connecting to the PLC*) for the installation procedure.

3.2. VIDEOS AND QR CODES

Lab activities contain QR codes such as the one below. Click these codes or scan them with your smartphone to watch instructional or illustrative videos that are relevant for the specific lab activity task.

An example QR code is given here:



IO-Link Master IoT port blinking green. Click or scan the above QR code to watch the video.

4. List of Lab Activities

Below is the list of lab activities in the *Smart Sensors with Allen-Bradley CompactLogix PLC Experimentation Package*.

Note: Lab activities may be password protected. Contact support@intelitek.com if you have not received passwords for the activities.

No.	Title	Description
7	Connecting to the PLC	Create the PLC / IO-Link master network and configure communication between the devices.
8	Slave Devices and the PLC: Part 1	Connect the stack light, photoelectric, ultrasonic, and inductive smart sensors to the network. Use Studio 5000 Logix Designer's Tag Monitor to monitor sensor readings and control the output of the stack light.
9	Slave Devices and the PLC: Part 2	Build ladder logic routines in which the output of the stack light is dependent on the readings of the various smart sensors.
10	Basic Exercises for Slave Devices	Create ladder programs in Logix Designer using sensors as input devices and the stack light as the output device.
10B	Basic Exercises for Slave Devices: Solutions	Review potential solutions for the control programs.
11	PLC-sensor Communication: RFID	Use Logix Designer to write data to and read data from RFID tags.
12	The RFID Head and Controller Logic	Create a Logix Designer project where the output status of the stack light is dependent on the reading of the different sensors and the data read from RFID tags.
12B	The RFID Head and Controller Logic: Solutions	Review possible solutions for the programs that integrate the RFID head.
13	Connecting to an HMI	Connect a PanelView HMI module to your network and configure it for your PLC project. Build a dashboard screen to display smart sensor readings.
14	RFID and the HMI	Integrate an RFID head and the stack light into your HMI project. Build a user interface on the HMI that allows the user to write a value to the ID tag, and when the ID tag is read, the stack light and HMI outputs change based on the value.
15	The Security System	Create a high security access system for employees of an industrial complex using the controller, HMI, smart devices, and RFID tags.