



## PORTABLE EDUCATIONAL SYSTEM FOR THE STUDY OF PROGRAMMABLE LOGIC CONTROLLERS, NETWORKS, AND SUPERVISORS DL CLPTR-SSC



### INTRODUCTION TO THE TRAINER

The **DL CLPTR-SSC** training course is intended for the study of theoretical and practical concepts related to the use, application and development of programmable logic controllers using actuators via I/O and RS485, TCP/IP and CANopen communication, which can provide the Modbus RTU communication protocols (**R**emote **T**erminal **U**nit), TCP/IP (**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol), and OPC-UA (**O**pen **P**latform **C**ommunications - **U**nified **A**rchitecture).

All the trainer components are inside a sturdy steel case with suitable transport devices and a non-slip support on the support base.

The case offers two compartments, one horizontal and one vertical, both supported by a locking device that limits their angle. Circuits, components, and devices are mounted on an electrically insulated and appropriately screen-printed frame.



DL CLPTR-SSC is designed for **technical training** on:

- **PLC (Programmable Logic Controllers)** - Devices used for industrial automation, programmable to manage digital and analog inputs/outputs.
- **Industrial networks** - Communication systems between devices (such as PLCs, sensors, actuators) based on protocols such as Modbus, Ethernet/IP, etc.
- **Supervisors (SCADA)** - Supervision and control software that allows remote monitoring of industrial plants and processes.

Its **main features** are:

- **Portability** - Compact structure, often in a case, easy to carry.
- **Modularity** - Components separated to simulate different industrial scenarios.
- **User Interface** - Display, buttons, sensors, actuators, communication ports.
- **Educational software** - PLC development environments (e.g., TIA Portal) and SCADA simulators.
- **Connectivity** - USB, Ethernet, RS485 for connection to PC or tablet.

## MAIN COMPONENTS and TECHNICAL CHARACTERISTICS

### GENERAL POWER SECTION

For powering the system from the mains with a single-phase socket for plugging in, a 3A double-pole circuit breaker and an LED status indicator.

- AC Input: Single-phase mains voltage.
- DC output: 24V/3A.



### DELTA PLC SECTION






Designed for the automatic control of industrial machines and processes. Reliable and versatile, ideal for both industrial applications and technical training.

It has the following technical characteristics:





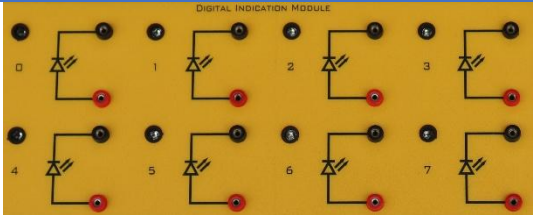
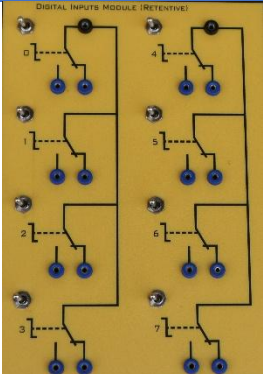
- 16 sink-type digital inputs.
- 16 source-type transistor digital outputs.
- 8 analog inputs for reading voltage from 0 to 10 Vdc and/or current from 0 to 20 mA (configurable).
- 4 analog outputs for voltage from 0 to 10 Vdc and/or current from 0 to 20 mA



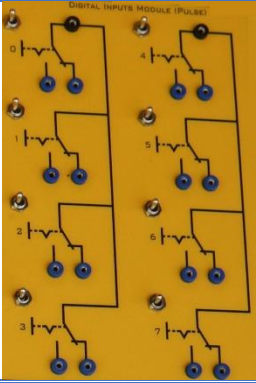
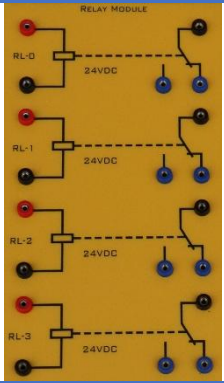
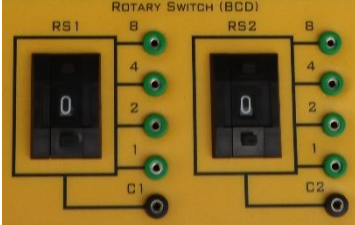


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| <p>(configurable).</p> <ul style="list-style-type: none"><li>• 4 RTD analog inputs.</li><li>• RS485 communication port.</li><li>• CANopen port.</li><li>• USB port.</li><li>• Ethernet communication port.</li><li>• WEB server.</li><li>• Development software.</li></ul>  |  <p>PLC RS485</p>   |
| <h3>SIEMENS PLC SECTION</h3> <p>It is among the most widely used programmable logic controllers in the industrial automation sector. Compact, ideal for simple and educational applications, it offers scalable solutions for controlling complex machines, systems, and processes.</p> <p>It has the following technical characteristics:</p> <ul style="list-style-type: none"><li>• 6 digital inputs.</li><li>• 4 digital outputs.</li><li>• 2 analog inputs for voltage reading from 0 to 10 VDC.</li><li>• Ethernet communication port.</li><li>• Web server.</li><li>• OPC-UA server.</li><li>• Development software.</li></ul> |  <p>ETHERNET</p>  |
| <h3>PLCs POWER SUPPLY SECTION</h3> <p>For powering the two DELTA and SIEMENS PLCs.<br/>24 Vdc power supply with on/off switch.</p>  |  <p>PLC POWER SUPPLY INPUT</p> <p>+ 24VDC -</p> <p>ON OFF</p>  |
| <h3>HMI SECTION</h3> <p>It's a device that allows operators to interact with machines, systems, or automation systems. Through the HMI, industrial processes can be <b>monitored, controlled, and configured</b> intuitively and visually.</p> <p>It has the following technical characteristics:</p> <ul style="list-style-type: none"><li>• Screen type: TFT LCD.</li><li>• Display: 7", 800*480.</li><li>• RAM: 256MB.</li><li>• Flash: 256MB.</li><li>• CPU: ARM Cortex-A8.</li><li>• Ports: RS485, Ethernet, USB.</li><li>• Development software.</li></ul>  |    |



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| <p>The SCADA supervisor is without TAG limitations with 30 min execution time (reusable).</p>  |    |
| <p><b>ANALOG SIGNAL SOURCE SECTION</b><br/>Two analog signal sources with 0÷10V/20mA DC outputs, available on dedicated terminals and variable via knobs.<br/>24 Vdc power supply with switch.</p>   |     |
| <p><b>DIGITAL VOLTMETER SECTION</b><br/>Range 0 ÷ 30Vdc with input terminals.</p>  |    |
| <p><b>TRAFFIC LIGHT SIMULATOR SECTION</b><br/>It consists of two sections to simulate a traffic light with 24 Vdc power supply, terminals and LEDs.</p>  |  |
| <p><b>SIGNAL LIGHTS SECTION</b><br/>With 8 LEDs powered by 24 Vdc, each with its own terminals.</p>  |   |
| <p><b>DIGITAL INPUT MODULE SECTION (RETENTIVES)</b><br/>With 8 switches simulating digital input signals (retentive) with 8 fixed contacts with retaining terminals, 1 NC/1 NO each, for logic level simulation and with one common terminal for each group of 4 switches.</p> |  |



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| <p><b>DIGITAL INPUT MODULE SECTION<br/>(IMPULSIVE)</b></p> <p>With 8 switches simulating digital input signals (impulse) with 8 impulse contacts with terminals, 1 NC/1 NO each, for logic level simulation and with a common terminal for each group of 4 switches.</p> |   |
| <p><b>RELAY MODULE SECTION</b></p> <p>With 4 electromechanical relays powered by 24Vdc, each with 2 contacts (1 NO/1 NC) and with a common terminal.</p>   |  |
| <p><b>ROTARY SWITCH SECTION (BCD)</b></p> <p>With two rotary switches (BCD), with 4 NO contacts available on terminals and a common terminal for each. Each contact closes with the position of the rotary switch.</p>   |  |

## EDUCATIONAL ACTIVITIES

With this system, the students can perform the following practical activities:

- Commissioning the Siemens S7-1200 PLC.
- Activating the Siemens S7-1200 PLC's clock and system bytes and changing the IP address.
- ***For the next three activities, the motor does not exist, but their purpose is to simulate starting, stopping and reversing of a real one:***
  - ◆ Starting and stopping a motor.
  - ◆ Starting and stopping a motor with the Siemens S7-1200 PLC using a program written in SCL.
  - ◆ Reversing a motor with the Siemens S7-1200 PLC.
- Structured programming and FC and FB blocks with SIMATIC STEP 7 in the TIA Portal.
- Monitoring and controlling an automatic process with the S7-1200 PLC and the OPC-UA protocol.
- Acquiring and monitoring analog signals from the S7-1200 PLC using the OPC-UA protocol.
- Monitoring and controlling S7-1200 PLC data using its web server.
- Control system for a traffic light system with the Siemens S7-1200 PLC.



# AUTOMATION AND CONTROL



- Commissioning the DELTA AS332P PLC.
- Starting and stopping a motor with the DELTA AS332P PLC.
- Structured programming and FB blocks with DELTA DIADesigner.
- Monitoring and controlling an automatic process using a DELTA DOP-107DV HMI and a DELTA AS332P PLC.
- Acquisition and generation of analog signals using a DELTA AS332P PLC and a DELTA DOP-107DV HMI.
- Temperature measurement with an RTD-Pt100 sensor using a DELTA AS332P PLC connected serially to a DELTA DOP-107DV HMI.
- Angle measurement with a CANopen rotary encoder using a DELTA AS332P PLC and a DELTA DOP-107DV HMI.
- Acquisition of numerical data using a BCD rotary switch and a DELTA AS332P PLC and displaying them on a DELTA DOP-107DV HMI.

Supplied with a detailed practical manual and all the accessories, cables, and software necessary to carry out the practices listed above.