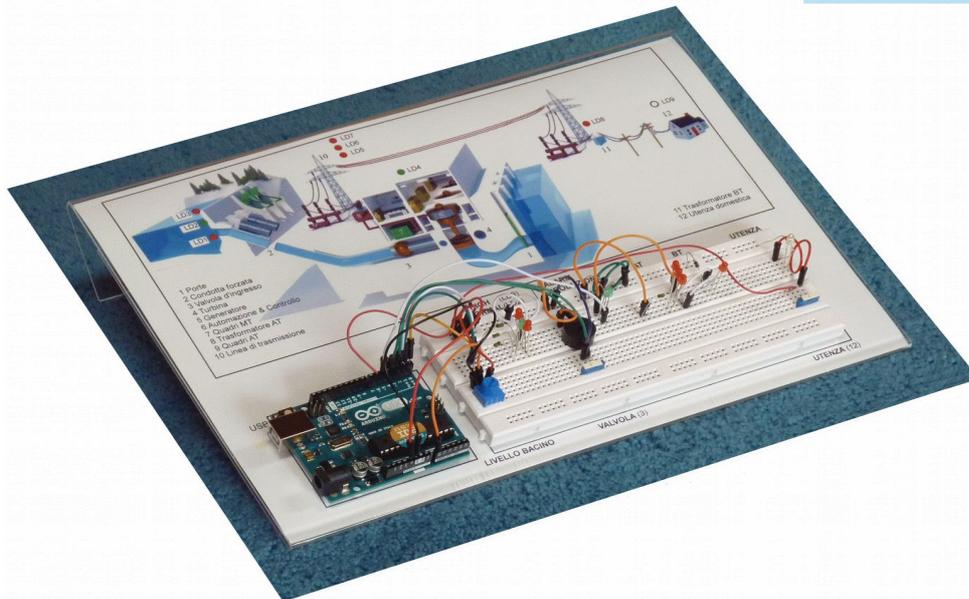


# hydroSIM

## MOD. T4E-SIM-01



**hydroSIM mod.T4E-SIM-01** is a compact simulator that shows the operation of a Hydroelectric power station, HV transmission line and end-user appliance using an **Arduino UNO** board.

The unit is designed to allow the learning of basic electronics, the use of electronic components and **Arduino UNO** board, and the code programming (**sketch**). It allows the study and understanding of the functioning of the complete system:

- generation of electrical power
- conversion from MV to HV
- transport with transmission line
- conversion from HV to LV and
- transport until the domestic user

It consists of:

- a transparent and ergonomic base which contains the block diagram of the system with all main components
  - an **Arduino UNO board** and
  - a breadboard with electronic components to be mounted
- The unit is powered by PC through the Arduino UNO board.

### COURSE PROGRAM

- Installation of the simulator by placing the Arduino UNO board and the breadboard
- Reading of electrical diagram attached, identification of electronic components supplied and construction of the electrical circuit on the breadboard
- Check that the circuit is made consistent with the electrical diagram
- Connecting the Arduino UNO board to the PC with the USB cable and start the PC
- Installation of the Arduino Software IDE and open the file with the **code (Sketch) included**
- Selection of input commands (potentiometer, switches) and observation of the unit state by the output (leds, buzzer)
- Analysis of the operating logic of the hydroelectric power station
- Performing electrical measurements with Tester (**option, not included**)
- Code analysis to observe the similarities between the operating logic of the simulator and the development of the code itself: it is supplied the **flow-chart** of the code
- Changing the code, load from your PC to Arduino UNO board and verification of the effects

### TECHNICAL SPECIFICATIONS

The Block diagram contains the following components:

- Dam, doors, penstock, input valve, turbine, generator, automation & control equipments, MV and HV switchgears, HV and LV transformers, transmission line, domestic applications

Nr.1 Arduino UNO board

Nr.1 Breadboard

Electronic components:

- leds, buzzer, potentiometer, resistors, switches

Wiring:

- flexible jumper cable
- mix color and length
- male to male

User controls:

- water level in the dam: continuously adjustable
- inlet valve: open, close
- domestic user appliance: on, off

Light indicators:

- water level in the dam: high, normal, low
- power production: on, off
- high voltage
- low voltage
- domestic user appliance

Sound indicator:

- alarm: high/low water level

Simulator is ready-to-use:

- Arduino UNO board is already programmed with its code

Accessories included:

- Student manual: contains exercises that describe how to use the unit and the code (sketch)

Power supply:

- by USB port of Arduino UNO board connected to a **Personal Computer or Power bank (not included)**
- by external power supply (**not included, option suggested T4E-MOD-01**)

Dimensions and weight:

- 310x210x70 mm
- Total weight: 1kg

## hydroSIM mod.T4E-SIM-01: example of installation and use

### Example 1

1. Use **with Personal Computer** for learning of code programming
2. Powered by **Personal Computer** (not included)



### Example 2

1. Use **without Personal Computer**
2. Powered by **Multifunction Power Supply Trainer** (not included, option T4E-MOD-01)



### Example 3

1. Use **without Personal Computer**
2. Powered by **Power Bank** (not included)

