

SOLAR DOMESTIC WATER HEATING



Experimental capabilities

- Identification of the components of a standard solar water heating system
- Visualization of the piping and assembly and of the components
- Installation, commissioning and settings
- Measurement of the parameters of the system (pressure, temperature, flow)
- Analysis of the efficiency of the system
- Programming the solar controller and use the data acquisition system to supervise the installation

Operating principle

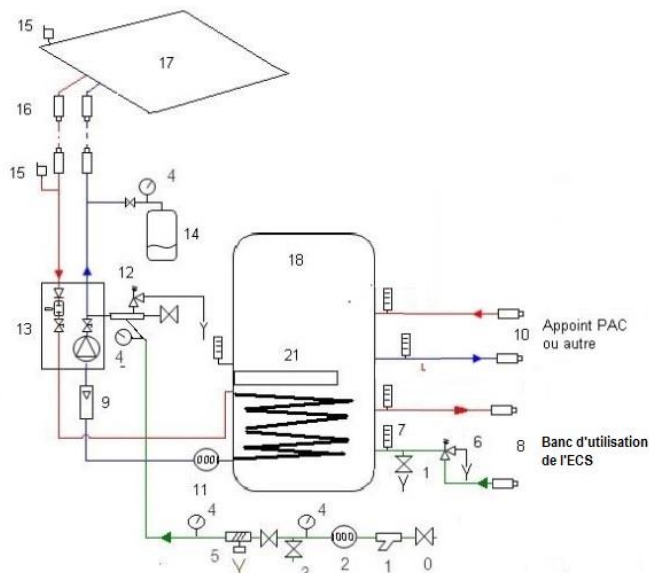
ERS 100 the bench allows the study of a solar domestic water heating system.

the system is composed of a solar panel, a water pump group, a water tank with an internal coil exchanger and a wash basin to use the hot produce. First the students have to install the equipment. They can set the panel inside the building with the infra-red light to simulate the sun or set it up outside of the building with real sun. Once the solar panel is connected they should fill up the water tank. They now do the commissioning of the system. When the water inside the panel is hot enough, the pump will start. The hot water is send inside the coil of the tank. The domestic water is separated from the water inside the panel (different circuit). The domestic water is heated and can be used in the wash basin. The students have to understand all the circuit and then work on the programming of the solar controller.

The robust design of this device makes it suitable for use in schools.

The equipment is set up on an Anodized aluminium frame on casters wheels. This gives it great strength and a flexibility of integration into your laboratory. The manufacture of this equipment complies with the European standard for machinery manufacturing.

Illustrations



0-Water supply valve 1-Y shaped strainer 2-Water meter 3-Check valve 4-Pressure gauge (0-6bars) 5-Adjustable pressure reducer 6-Back flow preventer 7- Dial thermometer (0-120°C) 8-quick connection to dhw unit 9-Float flowmeter (0-1000L/H) 10- quick connection to heat pump or boiler unit 11-Calories meter 12-Solar safety valve 13-Connection for the filling and flushing station + water pump 14-Solar expansion vessel 15-Solar automatic air drainer 16-Quick action coupling 17-Flat solar panel (1.87m²) 18-Water tank

Technical details

Frame N°1 : solar panel

- a solar panel with the following surface 1.87m²
- 2 quick acting coupling for the connection to the main unit
- a mechanical system to adjust the inclination of the panel. The position of the panel could be adjusted and keep every 10°.
- a pyrano-meter (for the use outside the building-real condition)

Frame N°2 : Main unit

- a water tank (200L) for the hot domestic water production. It includes a coil exchanger inside and an electrical heater for the safe mode (2KW)
- an electrical cabinet including :
 - circuit breakers, relays, lights and all the buttons
 - a solar controller where are connected 10 temperature sensors and the pyrano-meter. The controller runs the water pump
- 2 potentiometers to simulate the temperature of the panel and the temperature of the panel
- a pumping station with a variable speed pump and 2 thermometers.
- an hydraulic water circuit (for the panel) with two quick acting coupling for the connection to the panel, an air drainer, a safety valve, a connection for the fill up and flushing station, an expansion vessel, a calorie meter, a float flowmeter and a gauge.
- a supply water circuit with some valves, a water meter, a backflow preventer, a pressure reducer and two gauges.
- a water circuit for the domestic water with a check valve a safety valve and 2 thermometers.
- an additional water circuit to heat the tank

Accessories included :

- a software to collect the data from the controller and the cable to connect the machine to a computer.
- an Ethernet cable to link the unit to a computer

ERS100



Services required

- Electrical supply : 230 Vac – 50 Hz – 20 A
- Electrical network : 1 phase(s) + Neutral + Earth.
- Water supply : 15 L/min – 2 bars
- Water drain : on the floor
- Dimensions: (LxWxH mm):
Main unit: 2800 x 800 x 1920
Solar panel : 1965x800x1600
- weight (Kg): 320

Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine

Documentation

- User's manual
- Technical documentation of the components
- Lab exercises
- Software :
- Certificate of conformity CE

Options

- a « solar case » including a refractometer to check the glycol content, lotion to clean the refractometer, test strips the measure of the Ph, a compass, a gauge to check the expansion vessel, a screwdriver to control the voltage, a clinometer, a control form, a pipette for water intake, an analysis bottle, a multimeter. • Ref : ERS101
- a filling and flushing station with Wheel including a tank (30L), a pump and hte hoses with fitting for the connection to the circuit. • Ref : ERS102

Equipements complémentaires compatibles

- utilization of the dhw with faucet mixer • Ref : ECS100
- Solar simulation • Ref : ERS103
 - 2 infra-red heaters (2000W for each). The vertical position of the heaters can be adjusted and this should not require any tools.
 - a GFCI with power cable and a standard plug.



Valise solaire-ERS101



Station de charge-ERS102



Simulation solaire-ERS103