

HL 313

Domestic Water Heating with Flat Collector



Technical Description

The HL 313 trainer can be used to demonstrate the principal aspects of solar thermal domestic water heating in a system with components used in real world applications.

Radiant energy is converted into heat in a commercially available flat collector and transferred to a heat transfer fluid in the solar circuit. The heat then gets into the hot water circuit via a heat exchanger.

A solar regulator controls the pumps for the hot water and solar circuits. The solar circuit is protected by an expansion tank and a safety valve.

The trainer has been designed so that it is possible to carry out a complete preheating as part of a practical experiment.

The temperatures in the storage tank, at the outlet from and the inlet to the collector are measured, as is the flow in the solar circuit. Additionally, as in practice, the temperatures of the inlet and return are displayed on the solar circulation station.

In order to ensure there is sufficient illuminance, the system should be operated with solar radiation or the optionally available HL 313.01 Artificial Light Source.

The well-structured instructional material sets out the basic principles and provides a step-by-step guide through the experiments.

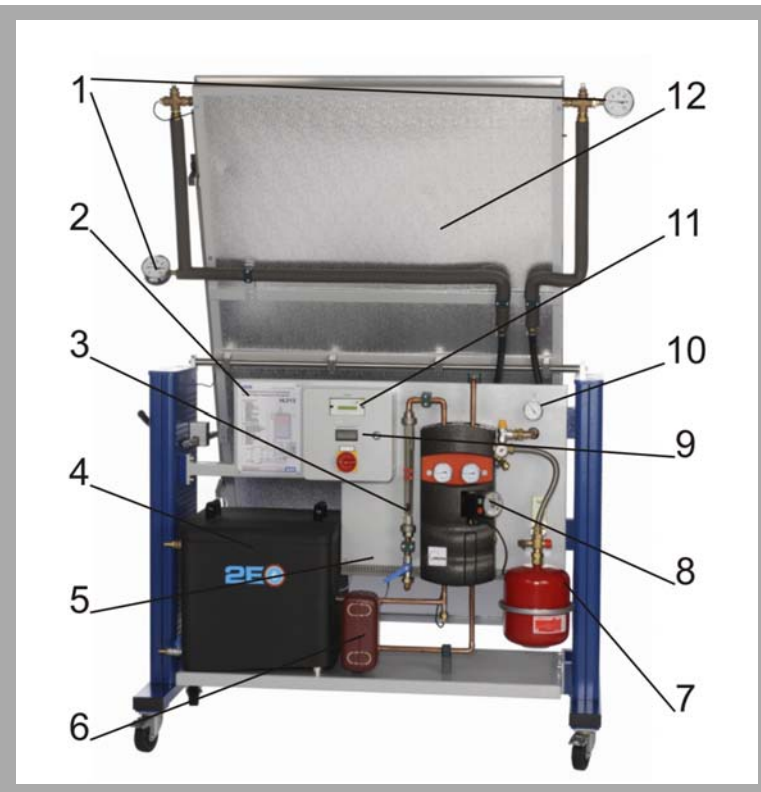
Learning Objectives / Experiments

- Familiarisation with the functions of the flat collector and the solar circuit
- Determining the net power
- Relationship between flow and net power
- Determining the collector efficiency
- Relationship between temperature difference (collector/environment) and collector efficiency

- * Conversion of solar energy into heat
- * Trainer with real-world components
- * Pivotal flat collector
- * System with heat exchanger and two separate circuits
- * Suitable for sunlight and artificial light

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1 inlet and return thermometer, 2 process diagram, 3 flow meter, 4 buffer tank, 5 hot water circuit pump, 6 heat exchanger, 7 expansion tank, 8 solar circuit pump, 9 illuminance display, 10 ambient air thermometer, 11 solar regulator, 12 collector

Specification

- [1] Trainer for investigating the function and operating behaviour of a flat collector
- [2] Solar thermal flat collector with selectively absorbing coating
- [3] Adjustable collector tilt angle
- [4] Solar circulation station with pump, expansion tank and safety valve
- [5] Hot water circuit with buffer tank, pump and plate heat exchanger
- [6] Solar regulator with three temperature sensors
- [7] Four bimetallic thermometers
- [8] Operation with solar radiation or HL 313.01 Artificial Light Source

Technical Data

Solar circuit

- collector absorbing surface: 2,5m²
- rated throughput: 40...150L/h
- operating pressure: 1...3bar
- safety valve 4bar

Hot water circuit

- plate heat exchanger: 3kW, 10 plates
- buffer tank 80L

Measuring ranges

- flow: 20...150L/h
- temperature: 4x 0...120°C

Dimensions and Weight

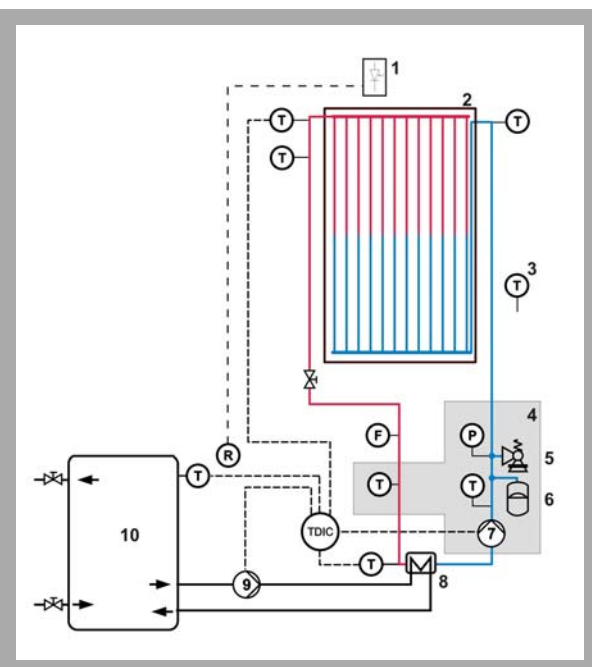
LxWxH: 1660x800x2300mm
Weight: approx. 240kg

Connections

230V, 50/60Hz, 1 phase or 120V, 60Hz/CSA, 1 phase

Scope of Delivery

- 1 trainer
- 1 set of instructional material



F flow, T temperature, P pressure, R illuminance; TDIC solar regulator
1 illuminance sensor, 2 collector, 3 ambient air thermometer, 4 solar circulation station, 5 safety valve, 6 expansion tank, 7 solar circuit pump, 8 heat exchanger, 9 hot water circuit pump, 10 buffer tank

Order Details

065.31300 HL 313 Domestic Water Heating with Flat Collector



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Available accessories:

Product no. Order text

065.31301 HL 313.01 Artificial Light Source