HL 313 Solar Collector System

*** Transformation of solar energy into heat**
*** Commercial solar collector**
*** Study of the function of a solar collector**
*** Suitable for sunlight and artificial light**

Technical Description

The HL 313 trainer demonstrates the main aspects of domestic solar water heating.

The solar energy is converted into heat by a solar collector and is transferred to the heat transfer medium in a solar circuit. The heat is transferred to the hot water circuit via a heat exchanger.

A solar controller controls the hot water circuit pump and the solar circuit pump. The solar circuit is protected by an expansion vessel and a safety valve.

The trainer is built using commercially available components. It is possible to study the complete heating process within the time frame of a laboratory lesson.

The solar circuit flow rate, temperatures at the collector inlet, the collector outlet and the reservoir are measured. In addition, the feed flow and the return flow temperatures are displayed at the solar circulation station, following commercial practice.

The system should be operated with sufficient irradiation intensity using direct sunlight or the optionally available artificial light source HL 313.01.

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

Learning Objectives / Experiments

- Familiarisation with a solar thermal circuit
- Functioning of a solar collector
- Correlation between temperature difference (collector - ambient) and collector efficiency
- Correlation between flow rate and effective power
- Calculating effective power

together with device to measure the irradiation intensity (not supplied)
- determination of collector efficiency

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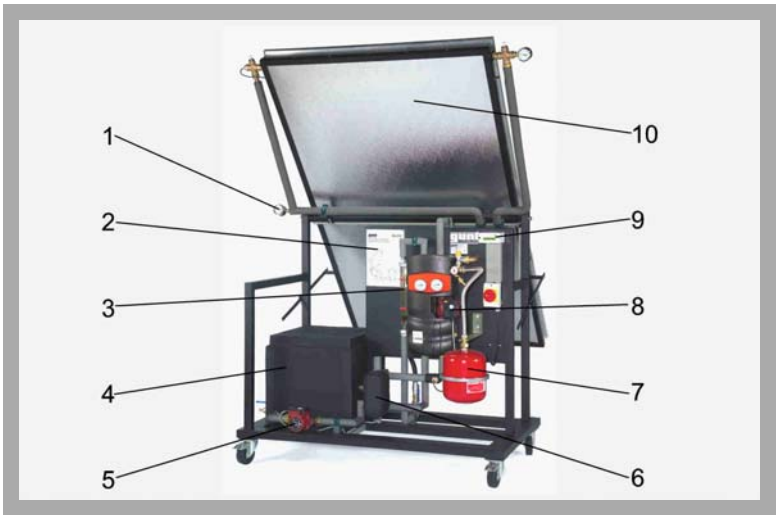
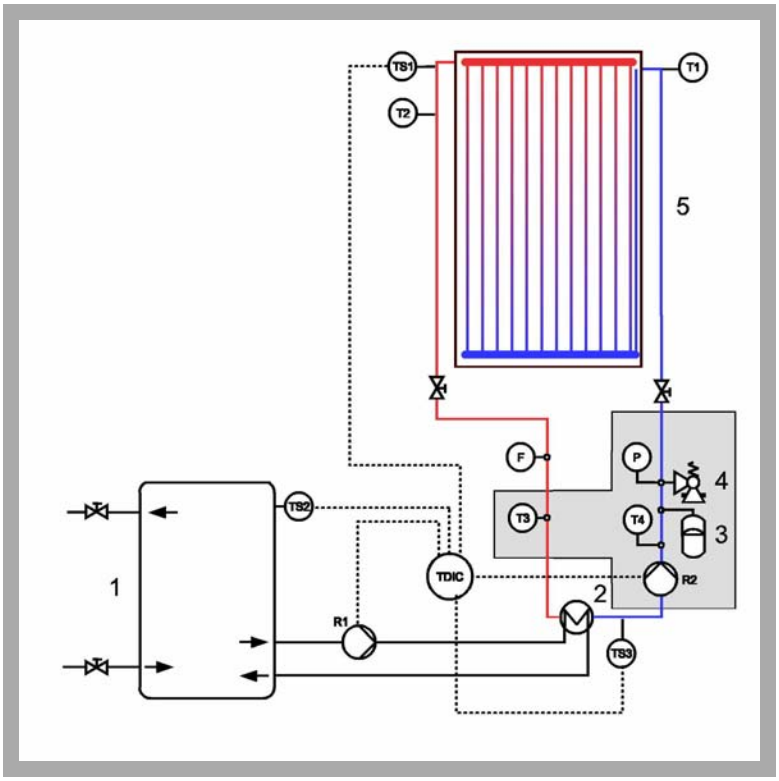


1 thermometer, 2 process schematic, 3 flow meter, 4 reservoir, 5 warm water circuit pump, 6 heat exchanger, 7 expansion vessel, 8 solar circuit pump, 9 solar controller, 10 collector



F flow rate, T temperature, TDIC solar controller, R1 pump in hot water circuit, R2 pump in solar circuit, P pressure;
1 warm water reservoir, 2 heat exchanger, 3 expansion vessel, 4 safety valve, 5 collector

Specification

[1] Mobile trainer for demonstrating the function and operating behaviour of a solar thermal system
[2] Solar flat plate collector with selectively absorbing coating
[3] Collector angle of inclination adjustable
[4] Solar circulation station with pump, expansion vessel and safety valve
[5] Hot water circuit with reservoir, pump and plate heat exchanger
[6] Solar controller with 3 temperature sensors
[7] 4 bimetallic thermometers
[8] Operation with direct sunlight or with the optionally available artificial light source HL 313.01

Technical Data

Solar circuit
- collector
  absorber surface: 2.5m²
  nominal transfer flow rate: 40...150L/h
  operating pressure: 1...3bar
- safety valve: 4bar

Hot water circuit
- plate heat exchanger: 3kW, 10 plates
- reservoir: 80L

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

Dimensions and Weight

l x w x h: 1420 x 800 x 2300 mm
Weight: approx. 240 kg

Connections

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

Scope of Delivery

1 trainer
1 set of instructional material

Order Details

065.31300	HL 313 Solar Collector System

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Available accessories:

Product no.	Order text
065.31301	HL 313.01 Artificial Light Source