

# HL 320.04

## Evacuated tube collector



### Learning objectives/experiments

- design and operation of the evacuated tube collector
- determining the net power
- parameters affecting collector efficiency
- integration of an evacuated tube collector in a modern heating system
- hydraulic and control engineering operating conditions
- creating energy balances
- optimisation of operating conditions for different types of use

### Description

- conversion of solar energy into heat in the evacuated tube collector
- pivotable collector with connections for the HL 320 modular system
- components for operational and system reliability from real-world modern heating technology
- suitable for sunlight and artificial light

The HL 320.04 trainer contains a modern evacuated tube collector and allows you to convert solar energy into heat. Evacuated tube collectors reach much higher operating temperatures compared to simple flat plate collectors due to the lower thermal losses.

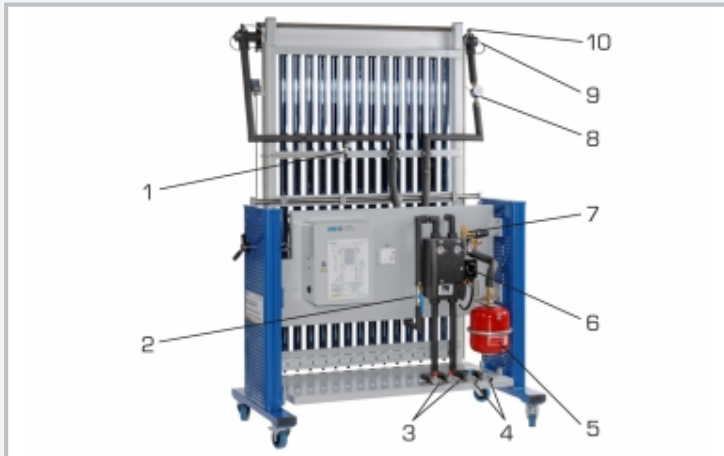
HL 320.04 is one of the modules from the HL 320 Solar Thermal Energy and Heat Pump modular system. The trainer can be incorporated into the modular system in a variety of different ways. The trainer can be used both for generating heated domestic water and for the combined production of domestic hot water and for heating rooms.

Pipe connections for the heat transfer fluid are easy to create and alter thanks to the quick-release couplings.

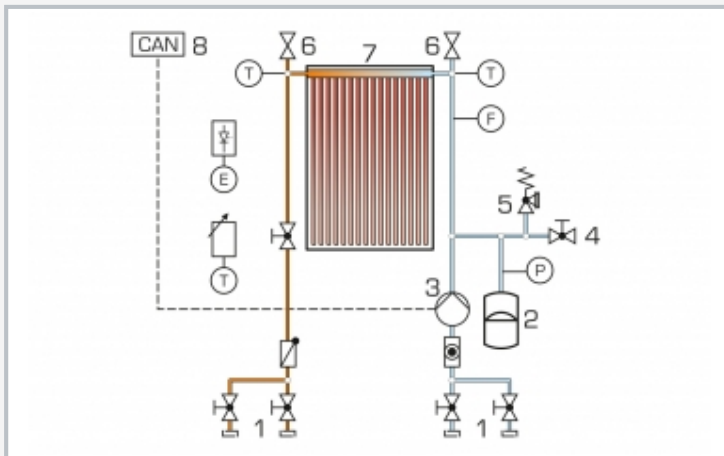
Carefully structured instructional materials have been created for the intended modular combinations with the HL 320.04 module. As part of the documentation for the HL 320 modular system, these materials set out the basic principles and provide a step-by-step guide through the experiments.

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1 pressure sensor, 2 shut-off valve, 3 connectors for warm water, 4 connectors for cold water, 5 diaphragm expansion vessel, 6 circulation pump, 7 pressure relief valve, 8 flow sensor, 9 temperature sensor, 10 vent valve



1 connections for heat transfer pipes with shut-off valves and quick-release coupling, 2 diaphragm expansion vessel, 3 pump, 4 fill valve, 5 pressure relief valve, 6 bleed valves, 7 evacuated tube collector, 8 CAN bus; E illuminance, F flow rate, T temperature, P pressure

### Specification

- [1] trainer for investigating the function and operating behaviour of an evacuated tube collector
- [2] evacuated tube collector with selective coating
- [3] adjustable collector tilt angle
- [4] solar circulation station with pump, expansion tank and safety valve
- [5] measurement instruments and controls by HL 320.05
- [6] operation with solar radiation or HL 313.01 artificial light source

### Technical data

#### Collector

- total area: 2,1m<sup>2</sup>
- absorbing surface: 1,5m<sup>2</sup>
- absorber content: 1,5L
- rated throughput: 58L/h

#### Solar circuit station

- solar pump: 3-stage
- safety valve: 4bar
- balancing valve: 1...13L/min

#### Measuring ranges

- temperature:
  - ▶ 2x 0...160°C
  - ▶ 3x -50°C...180°C
- flow rate: 30...1000l/h
- pressure: 0...6bar

230V, 50Hz, 1 phase  
 230V, 60Hz, 1 phase  
 LxWxH: 1660x800x2300mm  
 Weight: approx. 230kg

### Scope of delivery

- 1 trainer
- 1 manual

	1	2	3	4	5
HL 320.01			X	X	X
HL 320.02		X			X
HL 320.03	X	X		X	X
HL 320.04	(X)	(X)		(X)	(X)
HL 320.05	X	X		X	X
HL 320.07		X	X	X	X
HL 320.08			X	X	X

Recommended combinations of the HL 320 modular system

# HL 320.04

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### Required accessories

Combination 1		
065.32005	HL 320.05	Central storage module with controller
Combination 2		
065.32002	HL 320.02	Conventional heating
065.32005	HL 320.05	Central storage module with controller
065.32007	HL 320.07	Underfloor heating / geothermal energy absorber
Combination 4		
065.32001	HL 320.01	Heat pump
065.32005	HL 320.05	Central storage module with controller
065.32007	HL 320.07	Underfloor heating / geothermal energy absorber
065.32008	HL 320.08	Fan heater / air heat exchanger
Combination 5		
065.32001	HL 320.01	Heat pump
065.32002	HL 320.02	Conventional heating
065.32005	HL 320.05	Central storage module with controller
065.32007	HL 320.07	Underfloor heating / geothermal energy absorber
065.32008	HL 320.08	Fan heater / air heat exchanger

### Optional accessories

Combination 1, 2, 4, 5		
065.32003	HL 320.03	Flat plate collector
065.31301	HL 313.01	Artificial light source