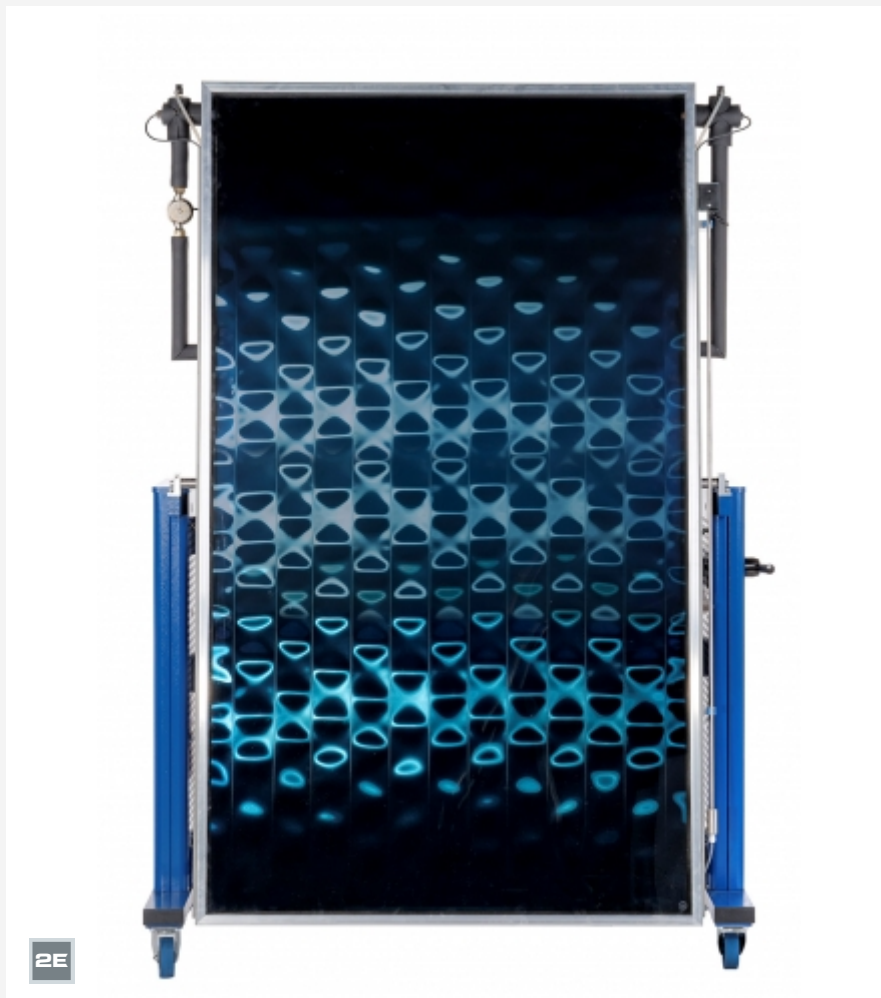


## HL 320.03

### Flat collector



#### Learning objectives/experiments

- layout and function of the flat collector
- determining the net power
- how temperature, illuminance and angle of incidence affect the collector efficiency
- integration of a flat collector in a modern heating system
- hydraulic and control engineering operating conditions
- energy balances
- optimisation of operating conditions for different types of use

#### Description

- **pivotal flat collector for converting solar energy into heat**
- **heat source 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**

HL 320.03 is one of the modules from the HL 320 modular system and allows you to convert solar energy into heat using a modern flat collector.

HL 320.03 can be incorporated into the HL 320 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.

Modules are connected rapidly and easily via hoses and quick-release couplings.

Different combinations for renewable heat sources can be tested and optimised in conjunction with other modules from the HL 320 system.

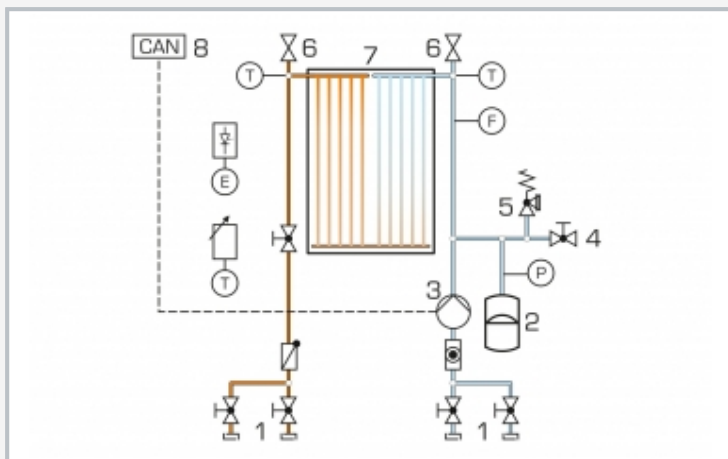
Carefully structured instructional materials have been created for the intended modular combinations with the HL 320.03 module. As part of the documentation for the HL 320 modular system, these materials set out the basic principles and provide a step-by-step guide through the experiments.

# HL 320.03

## Flat collector



1 vent valves, 2 lighting sensor, 3 flow sensor, 4 thermometer collector outlet, 5 shut-off valve, 6 connectors for warm water, 7 connectors for cold water, 8 diaphragm expansion vessel, 9 circulation pump, 10 pressure relief valve, 11 pressure sensor, 12 temperature sensor



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 flat collector, 8 CAN bus; E illuminance, F flow rate, T temperature, P pressure

	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

### Specification

- [1] trainer for the HL 320 modular system for the investigation of functional and operational 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] measurement instruments and controls by HL320.05
- [6] operation with solar radiation or HL 313.01 artificial light source

### Technical data

#### Collector

- absorbing surface: 2.5m<sup>2</sup>
- rated throughput: 40...150L/h
- operating pressure: 1...3bar

#### 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. 220kg

### Scope of delivery

- 1 trainer
- 1 manual

## HL 320.03

### Flat collector

#### 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		
065.32004	HL 320.04	Evacuated tube collector
065.31301	HL 313.01	Artificial light source