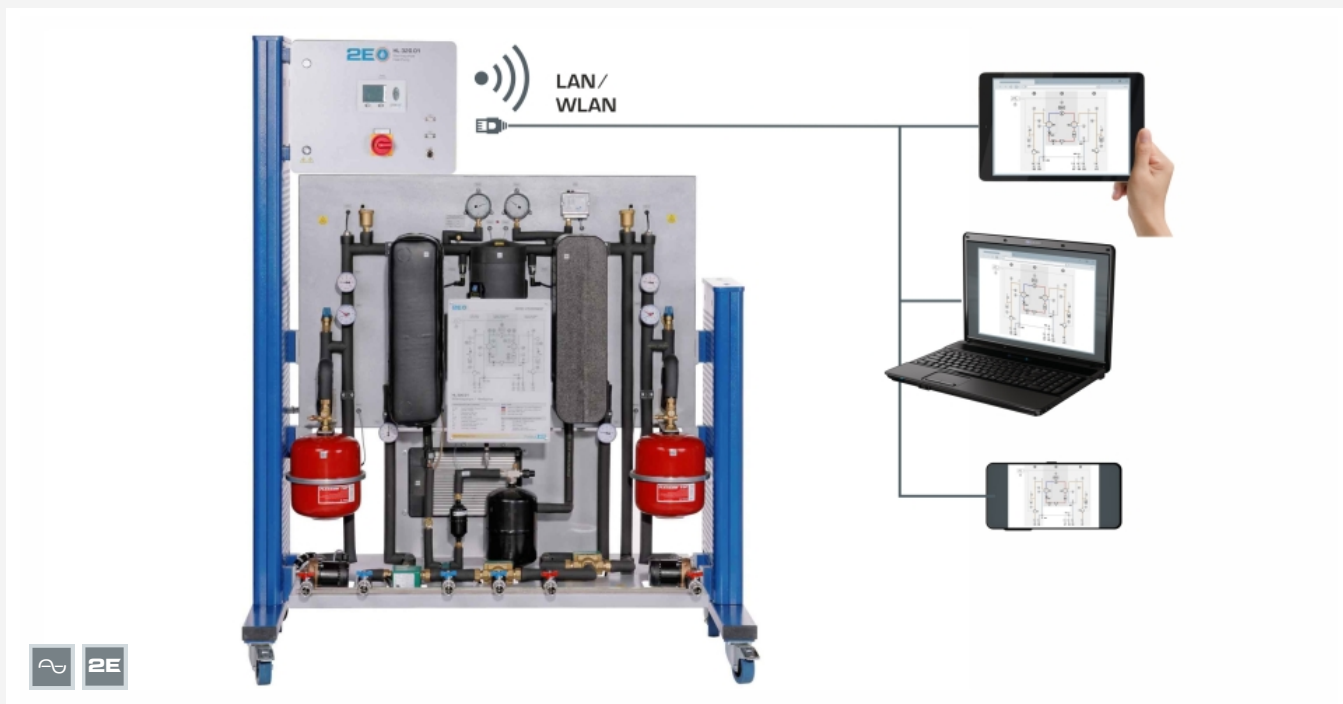


HL 320.01

Heat pump



Display of the heating controller's user interface on any number of end devices

Description

- heat pump for operation with different sources
- multiple system variants possible in conjunction with other HL 320 modules
- heating controller with data logger and integrated WLAN router for operation via web browser
- network capability: access to ongoing experiments from external workstations

The HL 320 modular system allows experiments on the generation, storage and use of heat from renewable energies. HL 320.01 includes a heat pump that can be connected to different heat sources and consumers. Together with other HL 320 modules it is possible to systematically investigate the possible variants for incorporating a heat pump into a modern heating system.

The heat pump comprises a compressor, a condenser, an expansion valve and an evaporator. These components are connected to each other via a refrigeration circuit. The refrigerant circulates in the refrigeration circuit powered by the compressor. A source's thermal energy is absorbed at the evaporator. Additional energy is added to the

evaporated refrigerant in the compressor. This energy can be output to a consumer as heat.

On the HL 320.01 trainer, the condenser can be incorporated into a heating circuit consisting of various consumers. The evaporator can be connected to a source circuit with different heat sources. The pipes with quick quick-release couplings, circulation pumps and accessories necessary to create these connections are provided.

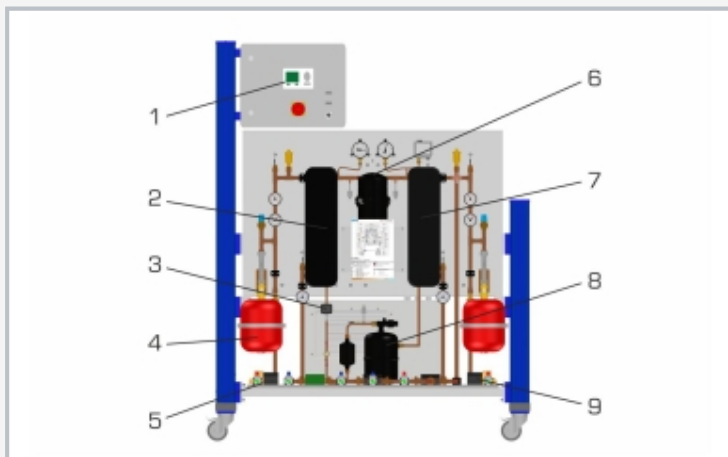
The heating controller is operated via an integrated WLAN router. The user interface can be displayed on any number of terminals via a web browser. Different user levels with different functions can be selected. A LAN/WLAN connection with the local network allows the evaluation of the recorded measured values on a PC. An additional manufacturer software of the heating controller is supplied for this purpose.

Learning objectives/experiments

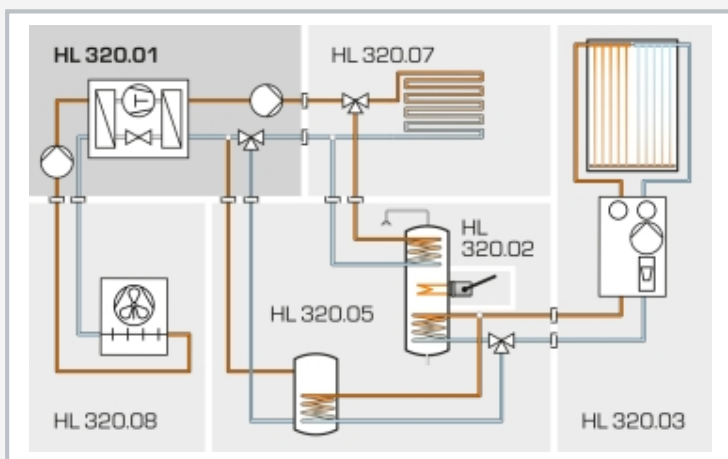
- familiarisation with heat pump applications for heating rooms and hot water
- using the heat pump for cooling
- advantages and disadvantages of various system configurations (brine heat pump, air heat pump)
- configuration and adjustment of a heating controller for heat pump control
- operating behaviour under varying heat supply and demand
- dependence of the coefficient of performance on source and sink temperature
- possibilities for optimising the seasonal performance factor

HL 320.01

Heat pump



1 heating controller, 2 evaporator, 3 expansion valve, 4 expansion vessel, 5 pump source circuit, 6 scroll compressor, 7 condenser, 8 receiver, 9 pump heating circuit



Inclusion of HL 320.01 in one possible configuration of the HL 320 modular system

	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] heat pump for the HL 320 modular system
- [2] connections for various heat sources and sinks
- [3] one circulation pump and one safety module each with expansion vessel for heating and source circuit
- [4] heating controller freely programmable, operation via web browser with LAN/WLAN connection
- [5] WLAN router with data logger, SD memory card included
- [6] sensors for temperature, flow rate and pressure with connection to the heating controller
- [7] remote learning: integrated WLAN router for access to ongoing experiments from any number of external workstations
- [8] experiment evaluation with additional manufacturer software of the heating controller
- [9] refrigerant R410A, GWP: 2088

Technical data

Heat pump

- heating capacity: approx. 2,3 kW at 5/65°C

Heating and source circuit pumps

- max. flow rate: 3m³/h
- max. head: 4m

Heating controller

- inputs: up to 16
- outputs: up to 16
- interfaces: DL bus, CAN, LAN

Refrigerant

- R410A, GWP: 2088, filling volume: 2,4kg, CO₂-equivalent: 5t

Measuring ranges

- temperature:
 - ▶ 4x -50...180°C
 - ▶ 3x 0...120°C
 - ▶ 1x -20...60°C
- flow rate: 2x 20...2500L/h (water)
- pressure:
 - ▶ 1x -1...15bar
 - ▶ 1x -1...49bar
 - ▶ 2x 0...6bar
 - ▶ 2x 0...50bar
 - ▶ 1x 0...18bar
 - ▶ 2x 0...10bar

400V, 50Hz, 3 phases; 400V, 60Hz, 3 phases
 230V, 60Hz, 3 phases; UL/CSA optional
 LxWxH: 1500x800x1700mm; Weight: approx. 125kg

Required for operation

PC with Windows

Scope of delivery

trainer, manual

HL 320.01

Heat pump

Required accessories

Combination 3

065.32007	HL 320.07	Underfloor heating / geothermal energy absorber
065.32008	HL 320.08	Fan heater / air heat exchanger

Combination 4

065.32003	HL 320.03	Flat collector
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

065.32002	HL 320.02	Conventional heating
065.32003	HL 320.03	Flat collector
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 4, 5

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