HL 320.05

Central storage module with controller

The illustration shows HL 320.05 with the switch box for HL 320.02

Description

- **module with buffer storage and bivalent storage for heating systems with renewable energies**
- **freely programmable universal controller with data logger and comprehensive software**
- **easily accessible quick-release couplings for all heat transfer pipes**
- **pump with speed control and driven three-way valve for various configurations**

The HL 320 modular system allows experiments on the generation, storage and use of heat from renewable energies. A variety of heat sources, storage types and consumers can be used. The system uses typical real-world components from the field of modern heating technology.

The HL 320.05 central storage module forms the core of the HL 320 modular system. HL 320.05 contains two different heat storage methods, piping, a pump, a driven 3-way valve and safety devices. Quick-release couplings on the front of the module enables the hydraulic connection to other modules of the HL 320 modular system.

HL 320.05 also includes the freely programmable universal controller UVR1611. This controller allows you to operate and study all intended HL 320 modular combinations.

Thoroughly documented configuration files for introductory and advanced experiments are available for all recommended HL 320 modular combinations. Newly created configurations or changes can be stored in the controller's memory. Easy-to-understand PC programs can be used to edit configurations and to acquire and display measured values.

Carefully structured instructional materials have been created for the intended modular combinations using the HL 320.05 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.

Learning objectives/experiments

- the following learning objectives can be worked through, depending on the selected HL 320 modular combination:
  - familiarisation with modern heating systems based on renewable energy sources
  - commissioning of heating systems with solar thermal energy and heat pump
  - electrical, hydraulic and control engineering operating conditions
  - properties of various heat storage methods
  - creation of energy balances for different system configurations
  - development of control strategies for different operating modes

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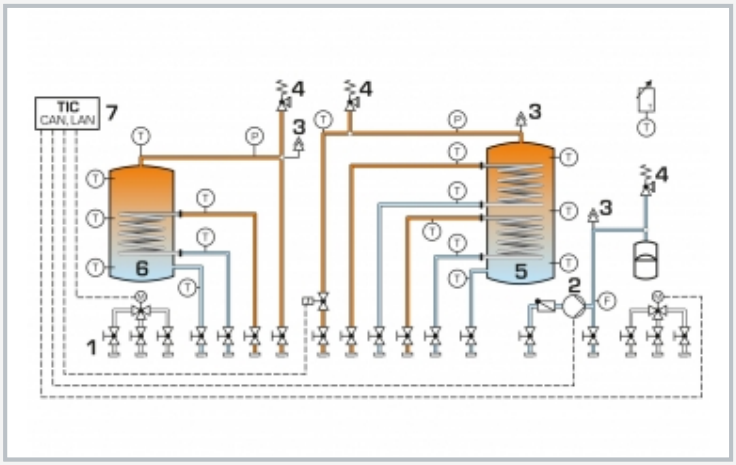
1 fresh water inflow, 2 temperature sensor, 3 bivalent storage, 4 bleed valve, 5 pressure relief valve, 6 freely programmable universal controller, 7 pressure sensor, 8 buffer storage, 9 speed-controlled pump, 10 driven 3-way valve



1 connections for heat transfer pipes with shut-off valves and quick-release coupling, 2 pump, 3 bleed valves, 4 pressure relief valves, 5 bivalent storage, 6 buffer storage, 7 TIC programmable universal controller; F flow rate, P pressure, T temperature

	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

Recomended combinations of the HL 320 modular system

Specification

[1] trainer with buffer storage and bivalent storage for experiments with the HL 320 modular system
[2] heat transfer pipes with quick-release coupling and shut-off valve
[3] pressure relief and bleed valves for safe operation
[4] circulation pump with differential pressure or speed control
[5] driven 3-way valves
[6] temperature sensors for heat storage and room temperature
[7] 2 pressure sensors for system monitoring
[8] flow meters and temperature sensors for determining the heat flows
[9] freely programmable universal controller with data logger and PC connection via LAN

Technical data

Buffer storage
- storage capacity: 150L
- number of heat exchangers: 1
- operating pressure: max. 5bar
- operating temperature: max. 95°C

Bivalent storage
- storage capacity: 200L
- number of heat exchangers: 2
- operating pressure: max. 5bar
- operating temperature: max. 95°C

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

Universal controller
- inputs: up to 16 (expandable)
- outputs: up to 16 (expandable)
- interfaces: DL bus, CAN, LAN

Measuring ranges
- temperature:
  - 16x -50°C...180°C
  - 1x 0...40°C
- flow rate: 30...1000L/h
- pressure: 2x 0...6bar

230V, 50Hz, 1 phase
230V, 60Hz, 1 phase, 120V, 60Hz, 1 phase
UL/CSA optional
LxWxH: 2400x810x1900mm
Weight: approx. 220kg

Required for operation

PC with Windows

Scope of delivery

1 trainer
1 set of instructional material (with sample programs for the universal controller)

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Required accessories

Combination 1		
065.32003	HL 320.03	Flat plate collector
Combination 2		
065.32002	HL 320.02	Conventional heating
065.32003	HL 320.03	Flat plate collector
065.32007	HL 320.07	Underfloor heating / geothermal energy absorber
Combination 4		
065.32001	HL 320.01	Heat pump
065.32003	HL 320.03	Flat plate collector
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
065.32003	HL 320.03	Flat plate collector
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