

HL 353.01

Comparison of different heating types



Description

- **setup of a complete domestic heating system together with hot water generator HL 353**
- **2 independent heating circuits:**
 - ▶ floor heating
 - ▶ forced convector with fan, 2 radiators
- **control devices for both heating circuits**

A complete domestic heating system can be set up using the trainer HL 353.01 together with a hot water generator, e.g. HL 353. Hot water passes through the radiators and heats the room air.

HL 353.01 contains two heating circuits. Both circuits are equipped with commercially available heating technology control devices. Each heating circuit contains a circulating pump. A digital, temperature led (outside temperature) heating controller controls the heating circuit (A) with floor heating. A three-way mixing valve is the actuator. The second heating circuit (B) contains a forced convector with temperature controller, a radiator with thermostatic valve and a radiator with one-pipe radiator valve.

The trainer is supplied with hot water from the supply unit HL 353 and is connected to the feed and return flow connectors using hoses with quick-release couplings.

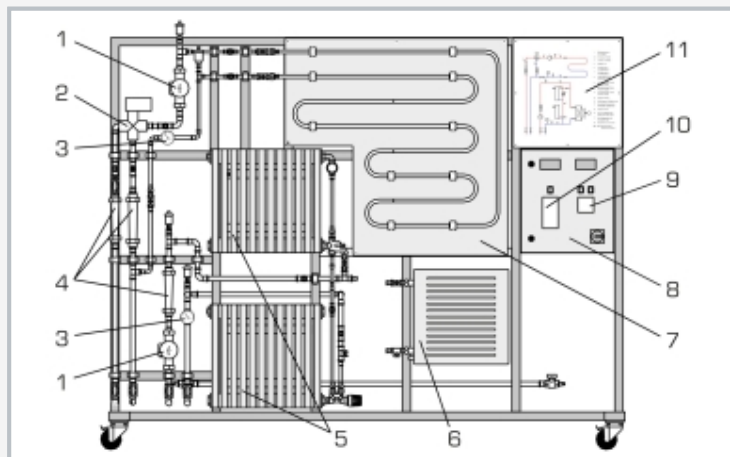
Measuring points for temperature, pressure, differential pressure and flow rate enable energy calculations and evaluations.

Learning objectives/experiments

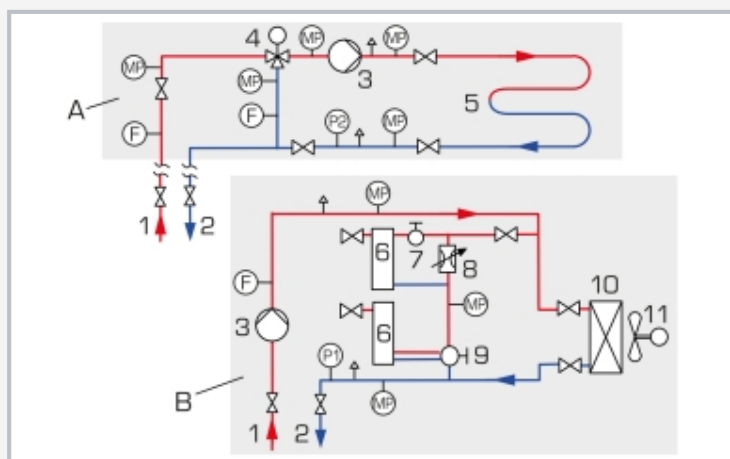
- design of a floor heating with controller and actuator
 - ▶ temperature-led heating controller (outside temperature) with three-way mixing valve
- design of a room heating system with radiators
 - ▶ thermostatic valve
 - ▶ one-pipe radiator valve
- design of a room heating system with forced convector with temperature controller
- function and design of commercially available heating technology components
- measurement of differential pressures, temperatures and flow rates
- energy calculation and evaluation of emitted heating capacity
- reading and comprehension of symbols and process schematics

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1 circulating pump, 2 three-way-mixing valve, 3 manometer, 4 flow meter, 5 radiator, 6 forced convector with fan, 7 floor 8 switch cabinet with displays and controls, 9 room temperature controller, 10 temperature-led heating controller, 11 process schematic



1,2 connections for supply unit (e.g. HL 353), 3 pump, 4 three-way mixing valve, 5 floor heating, 6 radiator, 7 thermostatic valve, 8 flow control valve, 9 one-pipe radiator valve, 10 forced convector, 11 fan;
A: heating circuit with floor heating, B: heating circuit with 2 radiators and forced convector;
P1-P2 manometer, MP measuring point for pressure or temperature, F flow rate;
red: feed flow, blue: return flow

Specification

- [1] together with hot water generator: setup of a complete domestic heating system with 2 independent heating circuits
- [2] heating circuit (A) with floor heating, circulating pump, heating controller, and 3-way mixing valve
- [3] heating circuit (B) with forced convector with fan, 2 radiators and circulating pump
- [4] 1 radiator with thermostatic valve and 1 radiator with 1-pipe radiator valve
- [5] room temperature controller for fan of forced convector
- [6] measurement of flow rate and pressure
- [7] 8 measuring points for differential pressure and temperature [temperature measurement via sensors of HL 353]
- [8] hot water connections with quick-release couplings

Technical data

Floor heating, Cu pipes

- length: 7500mm
- diameter pipe: 14mm
- wall thickness: 0,8mm
- filling volume: 1,2L/m

Radiator, steel

- heating capacity: 492W at feed flow 70°C, return flow 55°C and ambient temperature 20°C

Air heater

- heating capacity: 7,14...9,32kW at feed flow 90°C, return flow 70°C and inlet temperature 15°C
- max. flow rate: 1260m³/h

Pump

- max. power consumption: 60W
- max. flow rate: 3600L/h
- max. head: 4m

Thermostatic valve: 5...26°C

Measuring ranges

- pressure: 2x 0...1,6bar
- differential pressure: 1x 0...0,25bar
- flow rate: 1x 15...160L/h, 1x 100...1000L/h, 1x 20...250L/h

230V, 50Hz, 1 phase

LxWxH: 2500x760x2000mm

Weight: approx. 185kg

Scope of delivery

- 1 trainer
- 1 set of hoses
- 1 set of tools
- 1 set of instructional material

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Required accessories

HL 353 Hot water generator