HL 353.02

Heat distribution and control in heating systems

Description

- **setup of a complete domestic heating system together with hot water generator HL 353**
- **two independent heating circuits:**
  - **heating circuit with one subcircuit**
  - **heating circuit with two subcircuits**
- **two heat meters in the heating circuit with two subcircuits**
- **control devices for both heating circuits**

A complete domestic heating system can be set up using the trainer HL 353.02 together with a hot water generator, e.g. HL 353. Hot water passes through the radiators and heats the room air.

HL 353.02 contains two heating circuits. Both heating circuits are equipped with commercially available heating technology control devices. Each heating circuit contains a circulating pump.

The simple heating circuit with one subcircuit contains two flat radiators and is controlled by a temperature-led controller. A three-way mixing valve is the actuator. A simulator is supplied for varying the outside temperature.

The heating circuit with two subcircuits contains four radiators and two heating controllers. Solenoid valves enable control of the heat distribution in the two subcircuits.

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 temperatures, pressures, differential pressures and flow rates are available. The heating circuit with two subcircuits contains two heat meters to enable energy calculations and evaluations.

Learning objectives/experiments

- design of a room heating system with controller and actuator
  - temperature-led heating controller (outside temperature) with three-way mixing valve
  - simulator for varying outside temperature
- function and design of a room heating system divided into sections
- hydronic balancing of heating circuits with multiple radiators
- 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 based on measured quantity of heat
- reading and comprehension of symbols and process schematics

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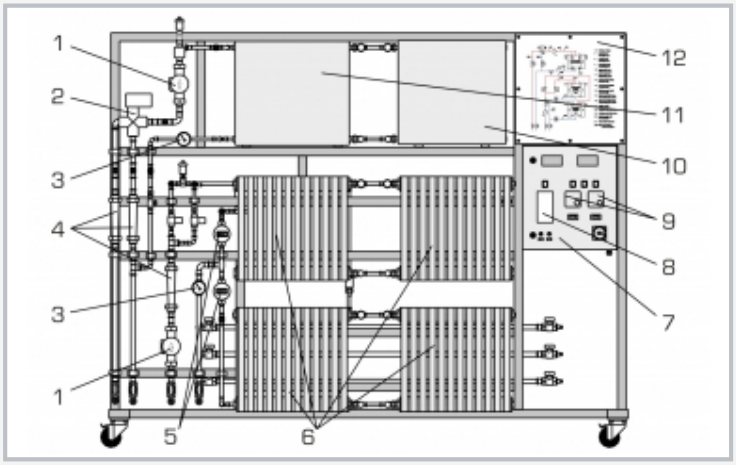
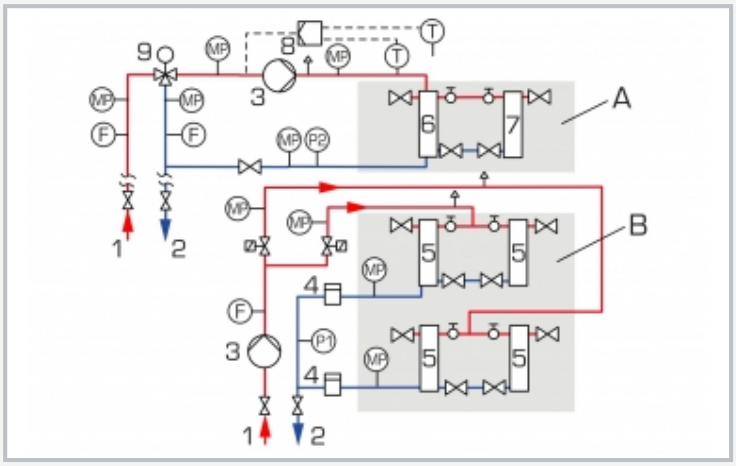


1 circulating pump, 2 three-way-mixing valve, 3 manometer, 4 flow meter, 5 heat meter, 6 radiator, 7 switch cabinet with displays and controls, 8 heating controller (circuit A), 9 heating controller (circuit B), 10 flat radiator (steel), 11 flat radiator (aluminium), 12 process schematic



1,2 connections for supply unit (e.g. HL 353), 3 pump, 4 heat meter, 5 radiator, 6 flat radiator (aluminium), 7 flat radiator (steel), 8 heating controller, 9 three-way-mixing valve; A: heating circuit with 1 subcircuit, B: heating circuit with 2 subcircuits; 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 1 subcircuit contains 2 flat radiators, 1 circulating pump, 1 heating controller with 3-way mixing valve and simulator for variation of outside temperature
[3] heating circuit (B) with 2 subcircuits contains 4 radiators, 1 circulating pump, 2 heating controllers, 2 solenoid valves
[4] flow control valves for hydronic balancing in heating circuit with 2 subcircuits
[5] measurement of flow rate and pressure
[6] 9 measuring points for differential pressure and temperature (temperature measurement via sensors of HL 353)
[7] hot water connections with quick-release couplings

Technical data

Flat radiator, aluminium
- heating capacity: 545W at feed flow 70°C, return flow 55°C and ambient temperature 20°C

Flat radiator, steel
- heating capacity: 665W at feed flow 70°C, return flow 55°C and ambient temperature 20°C

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

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

Heat meter: 20...90°C, 1m^3/h

Measuring ranges
- pressure: 2x 0...1,6bar
- differential pressure: 0...0,25bar
- flow rate: 3x 20...250L/h

230V, 50Hz, 1 phase
LxWxH:2500x760x2000mm
Weight: approx. 240kg

Scope of delivery

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

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Required accessories

065.35300	HL 353	Hot Water Generator