

WL 110

Heat Exchanger Service Unit



- * Heat exchanger service unit (WL 110.01-WL 110.04)
- * Heat exchanger operation in parallel flow or counterflow possible

Technical Description

Heat exchangers transfer thermal energy from the flow of one medium to another. The two flows do not come into direct contact with one another. Efficient heat transfer is a prerequisite for economical processes with high efficiency. Therefore, different heat exchanger types are used in practice depending on the requirements.

This experimental unit can be used to investigate and compare different heat exchanger designs. The complete experimental setup consists of two main elements: WL 110 as service and control unit and choice of heat exchanger: Tubular heat exchanger (WL 110.01), plate heat exchanger (WL 110.02), shell and tube heat exchanger (WL 110.03) and jacketed vessel with stirrer and coil (WL 110.04). Water is used as the medium.

The heat exchanger to be investigated is connected to the service unit. The hot water flows through the heat exchanger. Part of the thermal energy of the hot water is transferred to the cold water. Reversing the water connections changes the direction of flow and thus allows parallel flow or counterflow operation.

The main function of the WL 110 is to provide the required cold and hot water circuits. To do this, the service unit is equipped with a heated tank and pump for the hot water circuit, connections for the cold water circuit and a switch cabinet with displays and controls. A temperature controller controls the hot water temperature. The flow in the hot water and cold water circuit is adjusted using valves. The cold water circuit can be fed from the laboratory mains or the WL 110.20. The measured values can

be read on digital displays. At the same time, the measured values can also be transmitted directly to a PC via USB. The data acquisition software is included.

In experiments, the typical characteristic value determined is the mean heat transfer coefficient of the heat transfer areas.

The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

Learning Objectives / Experiments

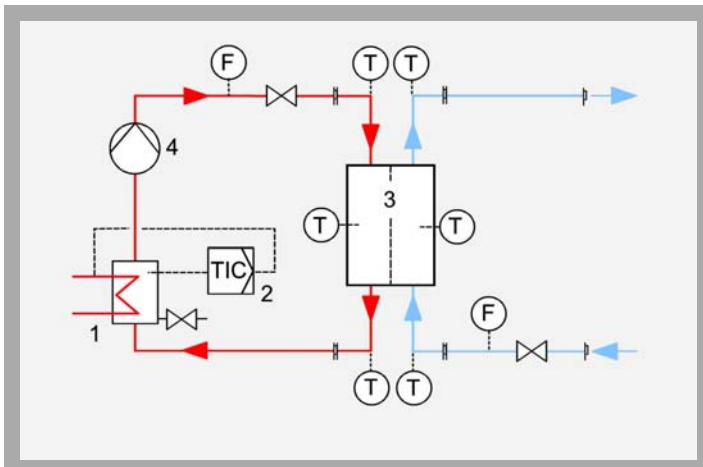
In conjunction with a heat exchanger (WL 110.01 to WL 110.04)

- Plotting temperature curves
- Determining the mean heat transfer coefficient
- Comparing different heat exchanger types

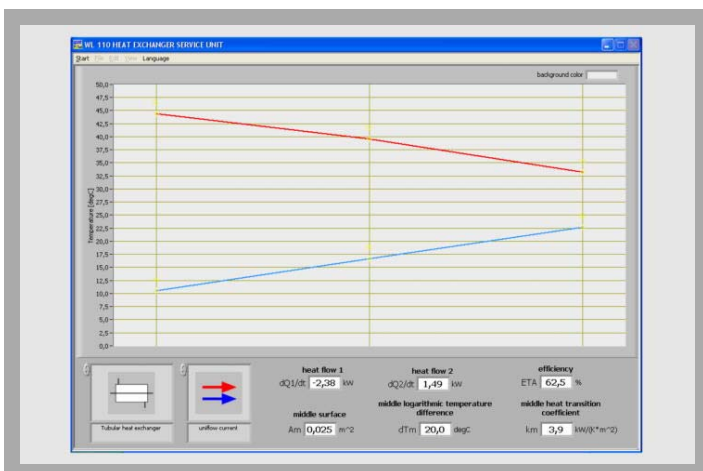
WL 110 Heat Exchanger Service Unit



1 temperature controller, 2 temperature displays, 3 flow rate displays, 4 jacketed vessel with stirrer and coil WL 110.04, 5 cold water circuit connections, 6 process schematic, 7 hot water tank



1 heated tank, 2 temperature controller, 3 heat exchanger (WL 110.01 to WL 110.04 accessories), 4 pump; red = hot water circuit, blue = cold water circuit; sensors: F flow, T temperature



Software screenshot: temperature curve for WL 110.01 in parallel flow operation

Specification

- [1] Service unit for heat exchangers
- [2] Hot water circuit with tank, heater, temperature controller, pump and protection against lack of water
- [3] Cold water circuit from laboratory mains or water chiller WL 110.20
- [4] Temperature controller controls the water inlet temperature for the hot water circuit
- [5] Flow adjustable using valves
- [6] Digital displays for 6 temperature and 2 flow rate sensors
- [7] Water connections with quick-release couplings
- [8] Stirrer connection with speed adjustment (WL 110.04)
- [9] LabVIEW software for data acquisition via USB under Windows XP or Windows Vista

Technical Data

- Pump**
- power consumption: 120W
 - max. flow rate: 420L/h
 - max. head: 25m
- Heater**
- power output: 3kW
 - thermostat: 0...100°C
- Hot water tank: 10L**

- Measuring ranges**
- temperature: 6 x 0...100°C
 - flow rate: 2 x 20...250L/h

Dimensions and Weight

l x w x h: 1050 x 660 x 580 mm
Weight: approx. 52 kg

Connections

230V, 50/60Hz, 1 phase or 230V, 60Hz, 3 phase or 208V, CSA, 3 phase
Cooling water 500L/h

Scope of Delivery

- 1 experimental unit
- 1 LabVIEW software CD + USB cable
- 1 set of instructional material

Order Details

060.11000 WL 110 Heat Exchanger Service Unit

WL 110 *Heat Exchanger Service Unit*

Available accessories:

Item no.	Order Details
060.11001	WL 110.01 Tubular Heat Exchanger
060.11002	WL 110.02 Plate Heat Exchanger
060.11003	WL 110.03 Shell and Tube Heat Exchanger
060.11004	WL 110.04 Jacketed Vessel with Stirrer and Coil
060.11020	WL 110.20 Water Chiller for WL 110