Computerized Heat Conduction in Gases & Liquids (Product Code: HMTC16)



Features

- Extensive range of Experiments
- Comprehensive teaching manual
- Three-year warranty
- Esthetically designed and finished Rig.
- High Quality instrumentation
- Steady-state heat conduction in gases and liquids
- Determination of thermal conductivities k of various fluids at different temperature

Product Description

Heat conduction is the transfer of thermal energy between neighboring atoms and molecules in a solid or in a fluid at rest. The heat transport is substance-bound. The effect of pure heat conduction is hindered in fluids by convection effects. This can be prevented by enclosing the fluids in gaps. This experimental unit serves to examine heat conduction properties of various fluids. The core element of the experimental unit is a cylindrical heat exchanger with a heated inner cylinder made of aluminium and a water-cooled jacket. There is a ring-shaped gap between the inner cylinder and the jacket, which is completely filled with the fluid or gas to be examined. The width of the gap is such that the heat transfer by convection is negligible. Due to the low temperature level and polished surfaces, radiation is also negligible. The thermal conductivities k of various fluids such as water, oil, air, oxygen or carbon dioxide can be determined in experiments. Sensors record the temperatures and the consumed heating power at all relevant points. The measured values can be read in the computer software.

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Product / Component Specification

Heat exchanger	Effective heat transfer area: 1500cm²
	Mean effective diameter: 39,6mm
	Gap width: 0,4mm
Heater	Max. Power consumption 160W
	Switch-off: at 95°C

Data Acquisition card

Analog Input	
Differential Channels	12
Resolution	12 bits
Sample Rate	200 Ks/s
Max Voltage	5 V
Number of Ranges	4
Simultaneous Sampling	Yes
On-Board Memory	5120 samples
Analog Output	
Channels	2
Digital I/O	
Input-Only Channels	30
Output-Only Channels	12
Timing	Software
Logic Levels	TTL
Maximum Input Range	0 V - 5V
Maximum Output Range	0 V - 3.3 V
Counter/Timers	
Counters	2
Max Source Frequency	84 MHz
Resolution	12 bits
Logic Levels	TTL
Total DC output Current on all I/O lines	130mA

Measurement of Temperatures at different points

Type	"K"
Range	0-300°C
Signal conditioning/transmitter	Standalone
Location	Cooling Water inlet Temperature
Type	"K"
Range	0-300°C
Signal conditioning/transmitter	Standalone
Location	Cooling Water Outlet Temperature
Type	"K"
Range	0-300°C
Signal conditioning/transmitter	Standalone
Location	Gas or Liquid Inlet Temperature
Type	"K"
Range	0-300°C
Signal conditioning/transmitter	Standalone
Location	Gas or Liquid Outlet Temperature
Type	"K"
Range	0-300°C
Signal conditioning/transmitter	Standalone
Location	Heater Temperature

Measurement of Voltage & Current

Type	Voltage Transducer
Range	0-300V
Signal conditioning/transmitter	Standalone
Type	Current Transducer
Range	0-10Amps
Signal conditioning/transmitter	Standalone

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