

COOLING TOWER TRAINER



Experimental capabilities

- Identification of the components of a cooling tower
- Commissioning and readings of measurements (T° , RH, flow, etc.)
- Study of heat exchange between water and air
- Thermal-efficiency balances
- Comparison of two types of packing
- Monitoring of the evolution of the air on a psychrometric diagram

Operating principle

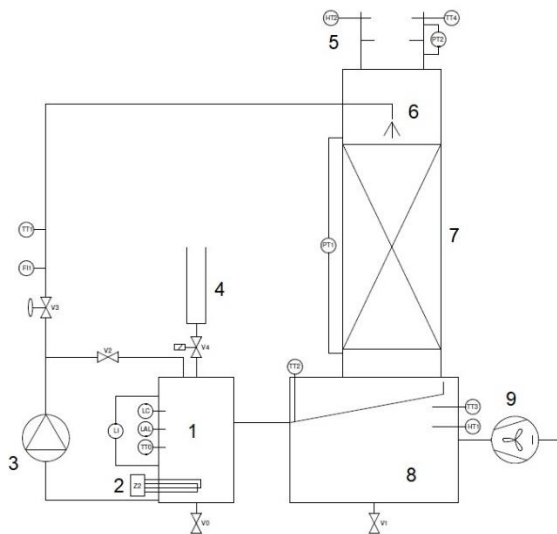
The PTR010 trainer allows the study of psychrometric phenomena that allow the processes of humidification and dehumidification, a process which occupies an important place in applications relating to the treatment of air in common use as in industry for example. It also allows the study of a particular application which consists of cooling hot water with air. Also, to meet these didactic requirements, we chose the forced refrigeration solution, which perfectly shows the process to be studied and which also allows simple and explicit experiments to be carried out. Users will be able to perform simple experiments and thus, assimilate the key concepts of the control principles necessary for the operation of the cooling tower and the installation procedure.

The robust design of this device makes it suitable for use in schools.

Anodized aluminum structure gives it a very robust as well as a flexible integration into your premises.

The manufacturing of this equipment meets European Machine Directive.

Illustrations



The trainer is installed on an aluminum profile structure equipped with four directional brake castors. It has an electrical box with general power disconnector and 30mA differential circuit breaker.

1. Stainless steel hot water tank

Volume of water: 15L
Max water temperature: 55°C
Side level indicator
Low-level safety for resistance protection

2. Electric heating resistance

Power : 3000W
Built-in safety thermostat

3. Centrifugal pump

Maximum flow rate: 20L/min
Maximum pressure: 3.5 bars

V3. Hot water flow control valve with a needle

4. Automatic water top-up

The top-up water is contained in a transparent 5L PVC graduated tank (consumption measurement)
The top-up solenoid valve is automatically controlled by a level sensor located in the water tank (1.)

Technical details

5. orifice plate for the airflow measurement

6. Water diffusion nozzle in the cooling column

7. Transparent cooling column

Trim height : 565 mm
Passage section: 150 x 150 mm
2 columns are provided (see details below)

8. Distribution chamber

Recovery of water flowing out of the column
Air distribution in the column

9. Centrifugal fan

EC type motor
Speed variation per potentiometer located on the enclosure

10. Instrumentation

Temperature measurement

t1 : tank water
t2 : water inlet tower
t3 : water output tower
t4 : air inlet tower
t5 : air output tower

Relative humidity measurement

h1: hygrometry air inlet tower
h2: hygrometry air outlet tower

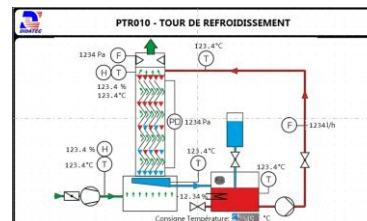
Differential pressure measurement

dP1: Column pressure drop
dP2: differential pressure of the diaphragm (5.)

Debit

Q1: Hot water flow

All measurements are displayed on a 7" touch screen located on the enclosure:



Services required

Documentation

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As part of the continuous improvement of our products, this technical specification may be modified without previous notifying

Illustrations non contractuelles / Illustrations not contractual



version : FT-PTR010-STD-E

- Electrical supply : 230 VAC – 50 Hz – 20 A
- Water : filling of the tanks
- Dimensions: (LxWxH mm): 1350 x 755 x 2050
- weight (Kg): 155

Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine

- User's manual
- Pedagogical manual
- Technical documentation of the components
- Lab exercises
- Wiring diagram
- Fluidic diagram
- Certificate of conformity CE

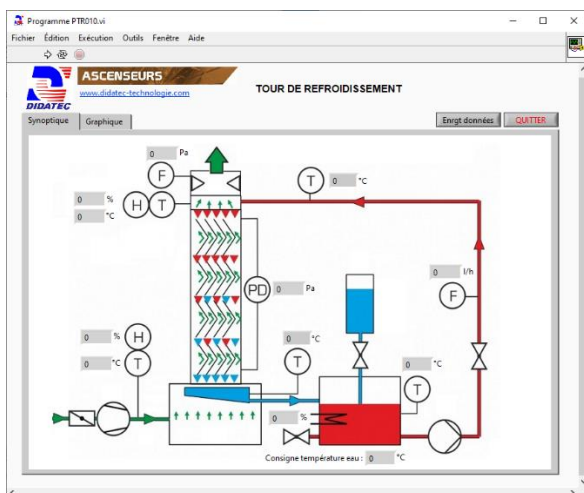
Cooling columns supplied

<i>1st tower</i>	<p>COOLING TOWER 144 PLATES</p> <p>DENSITY 200 m² / m³ (+/- 2%)</p>	
<i>2nd tower</i>	<p>COOLING TOWER 56 PLATES</p> <p>DENSITY 77 m² / m³ (+/- 2%)</p>	

Data acquisition software

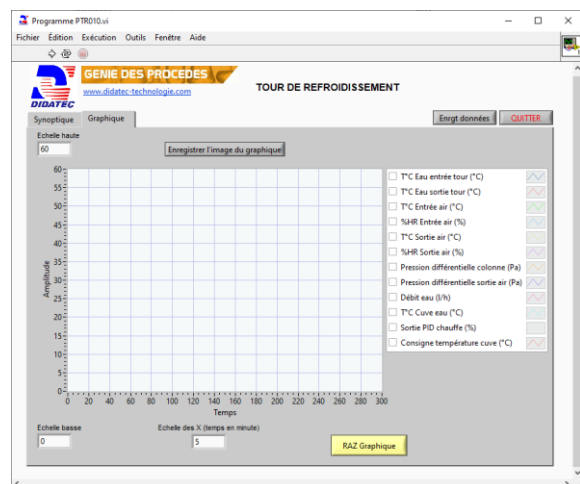
The trainer is also originally equipped with supervision and parameterization software. The connection to the computer is made by WIFI. The software is divided into two parts:

Synoptique



In this window we find the synoptic of the machine with the location of the different measurements of the process and their values.

Graph



We find in this graphic window, the possibility of drawing measurement curves according to time by selecting the desired values.