

TCP300



REVERSIBLE REFRIGERATION CYCLE DEMONSTRATION UNIT (AIR/WATER)



Experimental capabilities

- Identification of the components of a heat pump installation air / water reversible
- Visualization of the implementation of the system
- Visualization of the transformation of the refrigerant through glass shells (condensation or evaporation)
- commissioning, use and settings
- Study of the reversibility of the cycle
- Measurement of various operating parameters (power consumption, refrigerant and water temperature, pressure)
- Energy efficiency analysis of the system and draw of the refrigeration cycle on enthalpy diagram

DIDATEC– Zone d'activité du parc – 42490 FRAISSES- FRANCE
Tél. +33(0)4.77.10.10.10 – Fax+33(0)4.77.61.56.49 – www.didatec-technologie.com
email : service_commercial@didatec-technologie.com

Reproduction interdite / copy prohibited– Copyright DIDATEC juin-23- page 1

Dans le cadre de l'amélioration permanente de nos produits, ce descriptif technique est susceptible d'être modifié sans préavis
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-TCP300-STD-E

TCP300



Operating principle

The TCP300 bench allows the study of a refrigeration cycle.

The bench is made of standard elements of a refrigeration circuit. The compressor will first elevate the pressure and the gas temperature (R134a). The condenser will then transform this high pressure gas in the high pressure liquid. The high-pressure liquid will then be stored in a bottle and then be sent towards the expansion valve. This will change the state of the fluid, it will go from a high pressure liquid to a low pressure liquid. This low pressure liquid is now in the evaporator and will draw its energy on the coil (and thus cool it). The fluid is in the form of low pressure vapor, it goes through a suction line accumulator and be compressed again by the compressor. The bench comprises two exchangers, an air exchanger and a water exchanger. The air exchanger is similar to those found on conventional industrial installations.

The water exchanger is an exchanger didactic; students visualize the transformation because the refrigerant condenses between the glass shell and the cooling coil.

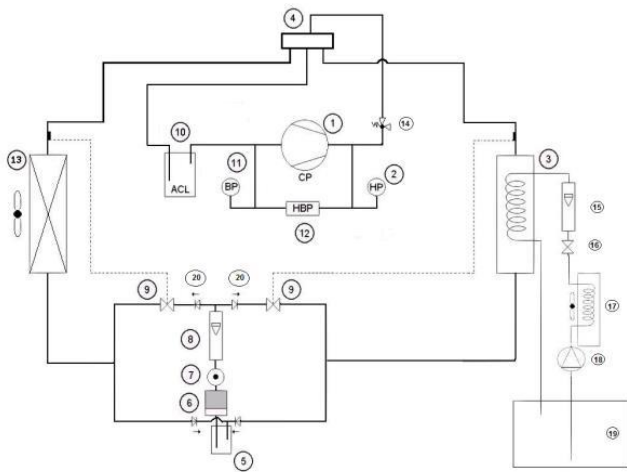
The machine cycle is reversible, Each exchanger can be used either as condenser or evaporator. The reverse cycle valve is similar to that found on conventional installations, particularly in the reversible air conditioning.

The bench is autonomous and requires a power supply 230VAC single phase + neutral. The module is set up on a frame made of screwed anodized aluminum profile (dimensions 45x45mm) equipped with directional castors with brake (diameter 100mm).

The robust design of this equipment makes it perfectly suited for use in schools.

Its anodized aluminum profile frame on multidirectional wheels with brakes makes it extremely robust as well as great flexibility of integration into your premises. The manufacturing of this equipment meets the European machine directive

Illustrations



This unit is set up on a frame made of aluminum profile with 4 wheels. It includes an electrical cabinet with main switch and differential circuit breaker.

1. Hermetic reciprocating compressor 408W for a range 7.2°C / 55°C
2. High pressure gauge R134a with dual scale temperature / pressure
3. Exchanger :
 - Resistant glass shell (pressure and temperature)
 - Volume of the exchanger: 1.19L
 - Fluid circulation between the shell and the coil
 - Backlit by LED light (improves the visualization)
4. Cycle reversing valve
5. Liquid receiver with service valve volume 0.7L
6. Drier filter
7. Sight glass
8. Refrigerant flowmeter R134a with needle with magnetic transmission
9. Thermostatic expansion valve with internal pressure equalization

Technical specifications

10. Suction line accumulator in steel volume 0.3L
11. Low pressure gauge R134a with double scale temperature / pressure
12. HP and LP safety pressure switch
13. Exchanger with forced air convection (R134a / air)
14. Safety valve set to 16 bars
15. Water float flowmeter
16. Water flow rate control valve
17. Exchanger with forced air convection (water / air)
18. Submersible water pump, Body, suction strainer and turbine in techno polymer
 - Power: 0.37KW maximum flow rate: 6m³ / h
 - Maximum head: 9mCE
19. Cooling water tank with lid:
 - Material: white polyethylene
 - Volume: 75L
 - Drain valve at the bottom

Integrated Instrumentation:

- Gauge low pressure: -1 to 10bar
- Gauge high pressure: -1 to 30bars
- Fluid flowmeter R134a: 40 to 250mL/min
- Water flowmeter: 0.2 to 1.5 L/min
- Thermocouple temperature probes T (X16) on the water, the refrigerant and the air (dry and humid temperatures): -20 to +100°C

The temperatures and the power are displayed on a 7" touch screen :

TEMPERATURE FLUIDE HAUTE PRESION (T1)	TEMPERATURE FLUIDE BASSE PRESION (T2)	TEMPERATURE FLUIDE DANS L'EVAPORATEUR (T3)
27.1 °C	78.1 °C	17.1 °C
TEMPERATURE AIR SECH (T4)	TEMPERATURE AIR HUMIDE (T5)	TEMPERATURE AIR HUMIDE (T6)
40.5 °C	45.2 °C	19.0 °C
TEMPERATURE FLUIDE DANS LE CONDENSEUR (T7)	PUISSANCE COMPRESSEUR	
17.2 °C	40.4 °C	172 W

Services required

- Power supply: 230Vac – 50 Hz – 10 A
- Power supply type: 1 phase(s) + Neutral + Earth.
- Water supply : filling (70L)
- Dimensions: (LxWxH mm): 1000 x 800 x 1510
- Weight(Kg): 110

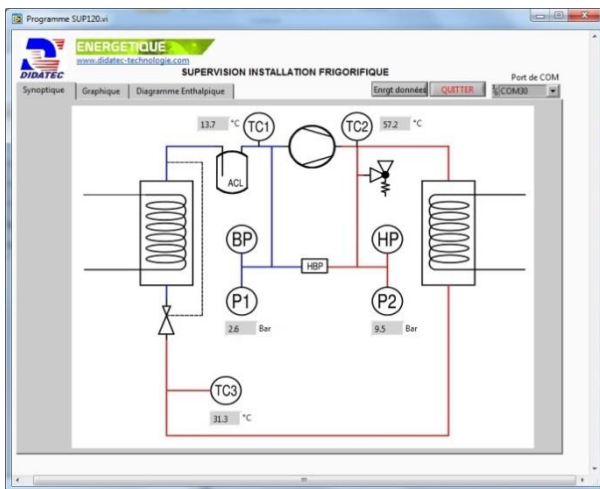
Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine

Documentation

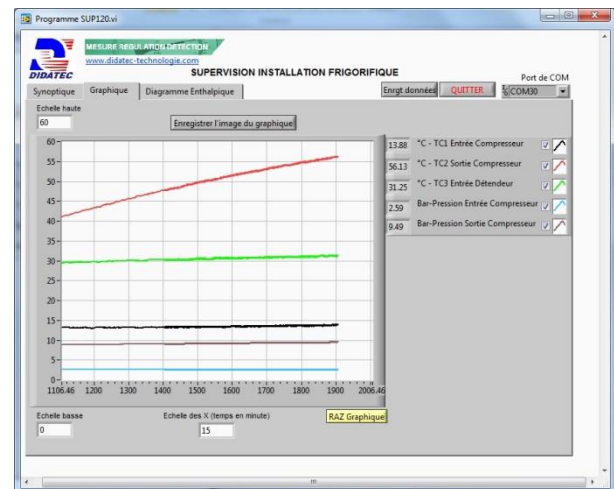
- User's manual
- Pedagogical manual
- Technical documentation of the components
- Lab exercises
- Wiring diagram
- Fluidic diagram
- Enthalpic diagram
- certificate of conformity CE

Options

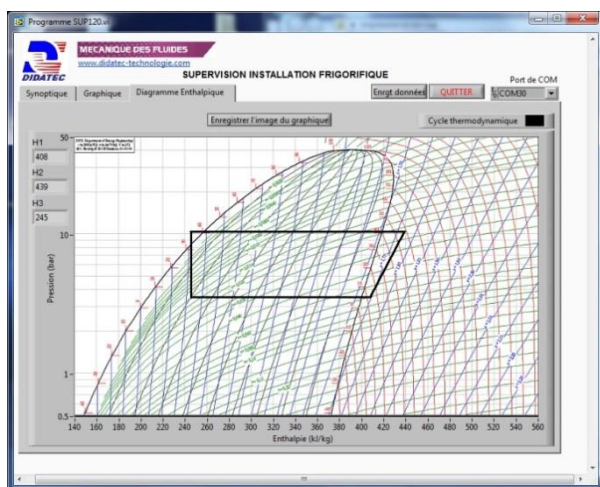
- Data acquisition system and real time drawing of the enthalpic diagram 3 temperature sensors and 2 pressure sensors (HP and LP) • Ref : TCP301
- Full Data acquisition system and real time drawing of the enthalpic diagram 16 temperature sensors, 2 pressure sensors (HP and LP), 3 flow sensors (water, air and frigorific fluid) • Ref : TCP302



Schematic diagram with real time display



Real time trend



Real time enthalpic diagram