

REVERSIBLE HEAT PUMP AIR-WATER



Experimental capabilities

- Study of the basic concept of an air / water heat pump.
- Study of the concept of reversibility of the cycle.
- Study of the thermodynamic cycle. Layout of the cycle on enthalpy chart.
- Calculation of the coefficients of exchanges.
- Calculation of the outputs.
- Calculation of the heat balance

Operating principle

The installation is composed of two benches, one bench of production and one bench of dissipation by air heater

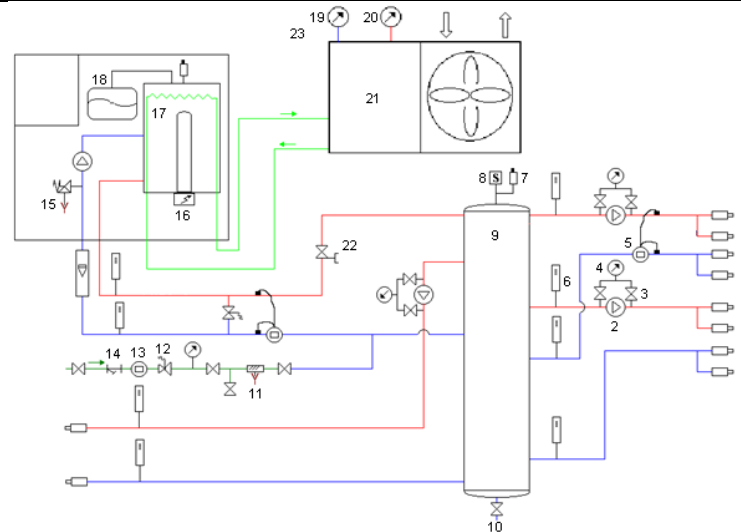
The robust design of this device makes it suitable for use in schools.

The equipment is set up on an Anodized aluminium frame on casters wheels. This gives it great strength and a flexibility of integration into your premises.

The manufacture of this equipment complies with the European standard for machinery manufacturing.

This equipment can be used alone or with other compatible equipment from our range (see last section of this document).

Illustrations



Technical details

Number	Naming
1	Fast coupling of coupling type.
2	Circulator
3	Shut off valve.
4	Oil filled manometer 0-4 bars.
5	Energy meter.
6	Thermometer.
7	Automatic air trap.
8	Safety valve.
9	Mixing bottle.
10	Drain valve.
11	Backflow preventer.
12	Pressure reducer.
13	Water meter.
14	Filter-sieve in Y.
15	Safety group.
16	Extra resistors
17	Buffer store.
18	Expansion tank.
19	Low pressure refrigerant manometer (LP)
20	High pressure refrigerant manometer (HP)
21	Air/water heat pump.
22	Balancing valve.

Services required

- Electrical supply : 230 Vac – 50 Hz
- Water supply : 15 L/min – 3 bars
- Water drain : on the floor
- Dimensions: (LxWxH mm): 2100 x 800 x 1750
- weight (Kg): 150

Documentation

- User's manual
- Technical documentation of the components
- Certificate of conformity CE

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

Instrumentations

Temperature probe, pressure in the characteristic points of the installation (primary and secondary), refrigerant and water flowmeter, Wattmeter.

The aimed educational activities are:

- Hydraulic and electrical wiring and coupling.
- Putting into service, adjustments and maintenance.
- Global heat balance and by subset.
- Technico-economic and environmental analysis.
- Installation dimensioning

Subunit HP on metallic frame composed of:

- Reversible air / water heat pump P=8, 29 KW for a water outlet in 35°C and an air inlet temperature of 7°C.
- Internal exchange module composed of :
 - 1 remote control.
 - 1 exchanger.
 - 1 flow sensor.
 - 1 trap
- Hydraulic module composed of :
 - 1 circulator.
 - 1 flow indicator.
 - 1 temperature indicator.
 - 1 control valve.
- Electric auxiliary unit 3 KW
- Software of statement of functioning parameters
- Box of electrical protection
- Electrical energy meters
- Mixing tank of 50 L
- Set of hydraulic accessories :
 - 1 expansion tank
 - 1 safety valve with manometer
 - 1 heating start circulator.
 - 1 heating start collector
 - 1 heating return collector
 - 1 filling set (Valves, Filter and valve clapper)
 - 1 drainage set (valve)
 - 1 filter sieve
- Refrigerant circuit R410A between the outside unit and the inside unit
- Subunit of hydraulic and aeraulic circuits measure
 - 2 meters of electrical energy
 - 2 meters of thermal energy with digital display
 - 1 flowmeter
 - 1 differential manometer
 - Sleeves and wall lamps to receive the PT 1000 temperature probes
 - Mixing tank temperature
 - External temperature
 - HP air inlet temperature
 - HP air outlet temperature
 - Water start temp
 - Water return temp
- Instrumentation of the cooling circuit
 - 1 manometer LP
 - 1 manometer HP
 - Temperature probe PT 1000
 - LP suction temp
 - HP backflow temperature
 - Evaporator inlet temperature
 - Evaporator outlet temperature
 - Pressure relief valve inlet temperature
 - Pressure relief valve outlet temperature
 - Condenser inlet temperature

ERT105



- Condenser outlet temperature

Acquisition and supervision unit of a climatic installation in a box form containing a datalogger and a communication module.

Terminal block

Data centralization, data recording

Player/recorder of multi-way temperatures

Recording and evolution of the 4 temperature probes. The data are exportable on PC for processing with the included software.