# STE130

# REVERSIBLE HEAT PUMP WITH PLC CONTROLLER


## Experimental capabilities

- **To measure, to evaluate characteristics**
- **To understand and interpret operations, electrical, electronic and fluidic**
- **Performance study**
- **Calculation of powers**
- **Study of the basic concept of an air/water heat pump**
- **Study of the thermodynamic cycle**
- **Calculation of the exchange coefficients**
- **Calculation of the efficiency**
- **Calculation of the thermal balances**
- **Operation of capacity, lost water or air heater**
- **Study of the reversibility of operation**

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version : FT-STE130-STD-A

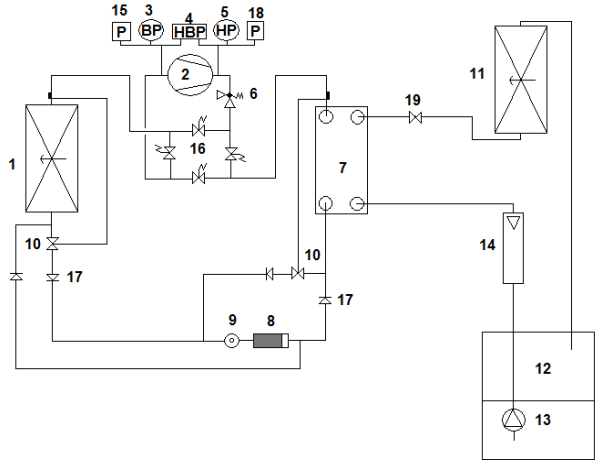
# STE130

## Operating principle

The bench STE 130 allows the study of a heat pump air/water reversible. The circuit is composed of a hermetic compressor, a plate heat exchanger (water), a forced air exchanger (air), a set of 4 valves allowing the reversibility of the cycle and all the accessories necessary for the operation and the study. The bench is supply with an auxiliary module including a water tank and a ventilated exchanger to dissipate the calories produced.
The electric box includes a PLC managing the operation and display the measurement. The signals from the sensors are transferred to dual well terminals opposite for external use.

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.

## Illustrations




The bench is installed on an aluminium profile structure equipped with four non slip feet.
It includes an electrical box with general power disconnector and 30mA differential circuit breaker

## Technical details

1. Forced convection air/fluid exchanger
2. Hermetic piston compressor 1000W
3. BP pressure gauge with dual pressure/saturation temperature display
4. HBP safety pressure switch
5. HP pressure gauge with dual pressure/saturation temperature display
6. Safety valve
7. Plate heat exchanger (water/refrigerant)
8. Filter drier
9. Fluid condition indicator
10. Thermostatic expansion valve
11. Forced convection air/water heat exchanger
12. Water tank
13. Water pump
14. Water flow meter
15. BP pressure analog sensor
16. Cycle reversing solenoid valves
17. Return valve
18. HP analog pressure sensor
19. Water flow control valve

## Instrumentation and modes of operation

- Heat pump operation management controller supplied with programming software and programming cable. The program is provided on digital media.
- Thermocouple type temperature sensor for measuring temperature in particular:
  Compressor input
  Compressor output
  Reducer inlet
  Water inlet exchanger
  Water outlet exchanger
- 2 analog pressure transmitters (high and low pressure)
- 1 water flow meter on the impulse output condenser
- All the data of temperature, pressure and flow, as well as the power consumed, the power restored and the efficiency of the pump can be visualized on the panel display.
- All these measurements are reported on 4mm double sockets compatible with the data acquisition module STE 005;
- 2 operating modes are selectable by switch
  Manual mode: continuous operation of the heat pump (hot or cold selectable by switch)
  Automatic mode: thermostatic operation /set temperature adjustable by the bench display keys.
  On/off and selection of the automatic heating / cooling mode of the heat pump.

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## Services required

- Electrical supply : 230Vac – 50 Hz – 16 A
- Electrical network : 1 phase(s) + Neutral + Earth.
- Water supply : filling the tank
- Dimensions:  (LxWxH mm): 1350 x 650 x 850
- weight (Kg): 90

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
- Wiring diagram
- Fluidic diagram
- Lab exercises
- Configuration files (PLC, controller)
- Software
- Certificate of conformity CE

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