



Radiator balancing bench

Balancing and commissioning of radiator columns

Description of the support

The **Radiator Balancing Bench** is a didactic system consisting of **six heat exchangers** called **water radiators**. The bench is easily connected to a water network, which in turn is connected to a heat pump (PAC) or a boiler. It can be used to heat rooms in order to contribute to the thermal comfort of people.

Water radiators have many qualities such as high thermal inertia, but they have one major disadvantage, which is that the **installation** must be **balanced to homogenise the heat** in a house.

The Radiator Balancing Bench provides energy conversion and the following main technical functions of :

- ✓ Heating
- ✓ Thermal regulation
- ✓ Temperature homogenisation
- ✓ Energy optimisation

The Radiator Balancing Bench implements :

- ✓ Steel and aluminium radiators
- ✓ Thermostatic valves
- ✓ Adjusting elbows
- ✓ Two risers
- ✓ Balancing valves and energy meters (optional)

The Radiator Balancing Bench allows for hands-on activities:

- ✓ Connection to a heat generator
- ✓ Commissioning and adjustments
- ✓ Study of pressure losses, observation and measurement of the effects
- ✓ Study of the balancing of heating networks, observation and measurement of the effects

The Radiator Balancing Bench is compatible with our hot water systems:

- ✓ Air / Water and Water / Water heat pumps
- ✓ Electric, Fuel, Gas and Wood Boilers

This system, designed to be connected to an energy production system, is accompanied by a technical file in digital format comprising :

- ✓ Functional and hydraulic diagrams, ...
- ✓ Data sheet, operating instructions, adjustment procedures
- ✓ Manufacturer's documentation of components.

Highlights

- ✓ Installation addressing the problems of district heating networks
- ✓ Possibility of carrying out an energy balance before and after a balancing operation

References

- ✓ **RA20** : Radiator balancing bench
- ✓ **RA11**: Energy Metering Option
- ✓ **RA12**: Balancing valve option
- ✓ **ME10** : Balancing case
- ✓ **PC21** : Data acquisition and supervision system for climatic installations
- ✓ **PC22**: Multi-channel temperature recorder and sensor for radiator columns

CAP Installation fitter

Thermal & Sanitary,

Bac Pro TISEC, TFCA, TMSEC,

BTS FED, MS - IUT

Universities - Engineering schools

Themes addressed

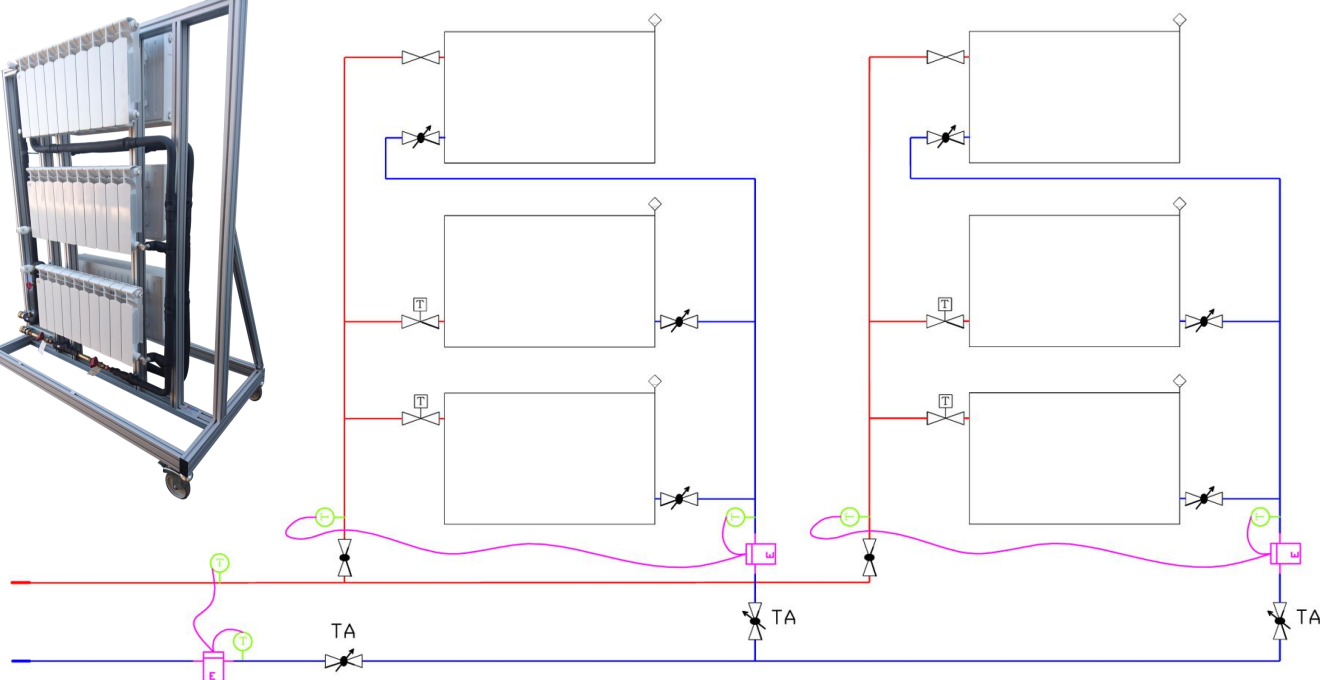
**Heating, Ventilation, Thermodynamics,
Thermal energy, Hydraulics, Aerualics,
Regulation, Energy management**



Installation features

RA20: Radiator Balancing Bench :

- ✓ Dimensions (LWD): 1600 x 940 x 2000 mm
- ✓ Mass: 350 kg (in water)
- ✓ Water connection with quick couplers



Hydraulic diagram of the radiator balancing bench
with the options energy meters and balancing valves

Description Radiator Balancing Bench (RA20)

The bench consists of :

- ✓ 1 aluminium profile frame mounted on 4 castors
 - ✓ 6 horizontal water radiators supplied by 2 risers (one on each side) each equipped with a flow control valve. The 6 radiators ensure energy conversion.
 - ✓ 1 hydraulic circuit with :
 - 4 thermostatic valves and 2 standard valves for the thermal regulation of the installation.
 - 6 Right-hand adjustment tee for balancing.
 - 6 Purging
 - Glove fingers for receiving temperature sensors
- The connection of the radiators is made of copper

The characteristics of the radiators are :

- ✓ Dimensions 400 x 800 mm
- ✓ Power 500 W with a water inlet temperature of 50°C, an outlet temperature of 40 to 45°C at an ambient temperature of 20°C.
- ✓ Steel and aluminium technologies to measure energy efficiency (3 radiators of each technology)

The system is supplied with water via 2 quick couplings with double shut-offs ensuring easy connection via flexible pipes to a heat generator (heat pump or boiler)

All the elements are industrial components used very frequently by professionals in the sector

Energy Meter Option (RA11)

The **Energy Meters** option consists of **three thermal energy meters with digital LCD displays**.

Two of them are installed on each radiator column return to measure the power emitted by each column.

The third is placed on the return of the radiator bench to make a power balance on the 2 columns.

They allow the measurement of :

- Flow
- Temperature (two temperature sensors supplied)
- Energy
- Power
- From energy day to survey day, ...

The meters are equipped with an M-Bus communication output allowing them to be connected to the central data acquisition and supervision unit of the climate system (PC21)



Option Balancing valves (RA12)

The **Balancing Valves** option consists of three valves with knurled knob and digital indicator for simple and accurate adjustment.

They are mounted on the return lines of the columns.

They allow balancing of the radiator column

The balancing valves are also equipped with self-sealing pressure taps.





Balancing case (ME10)

The balancing case is a kit for measuring and recording the differential pressure, flow, temperature and power of hydraulic systems. Reliable, accurate and easy to use, it makes balancing and troubleshooting a system faster and more economical. With the HySelect PC communication software, the user can retrieve and evaluate the recorded data, create professional reports and get automatic updates.

The case consists of two main components:

- ✓ The measuring instrument, a true computerised and programmed unit integrating hydraulic functions with easy to follow instructions on the colour screen
- ✓ The Dp differential pressure sensor that communicates wirelessly with the measuring instrument

The case also includes other components:

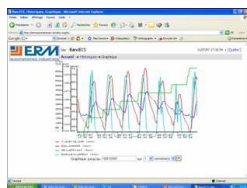
- ✓ Temperature sensor
- ✓ Pressure safety sensors
- ✓ Connecting hoses
- ✓ Measuring points with double needle
- ✓ HySelect software with USB connection cable
- ✓ Quick guide, user's guide and user's manual
- ✓ Many cables and tools



PC 21 : Data acquisition and supervision system for climatic installations

This option is a **data acquisition and supervision centre for climate systems**. It can measure and record all types of data and display them locally or remotely with its remote management software included. It consists of :

- ✓ An **iRIO remote management unit** with 16 universal analogue inputs (0/10V, 4-20mA, PT100, PT1000, CTN,...) and USB, RS232 and Ethernet communication module
- ✓ An **M-Bus gateway** for communicating sensors (energy meters)
- ✓ A web server remote management software with history, alarms,...
- ✓ 8 PT1000 temperature sensors on quick connectors
- ✓ 4 PT1000 temperature sensors on terminal block
- ✓ 4 jacks for M-Bus sensors



PC 22: Multi-channel temperature recorder and sensors

This option allows a temperature balance to be carried out at different points in a column of radiators. It consists of :

- ✓ A **multi-channel temperature reader/recorder** allowing the simultaneous recording of the evolution of 4 temperature probes. **The data can be exported to a PC for processing with the software supplied.**



- ✓ **Eight K thermocouple temperature sensors** that can be placed at different locations on the bench:
 - Entrance to the bench
 - Exit from the bench
 - Radiator inputs (3 inputs)
 - Radiator outputs (3 outputs)



Educational activities

The proposed educational activities allow the acquisition, consolidation and evaluation of the skills and knowledge of the professional reference systems related to the energy field.

The Radiator Balancing Bench works in conjunction with a hot water system to carry out these activities.

Possible and recommended activities include

- ✓ Functional and structural analysis of the installation
- ✓ Connection to a heat generator, commissioning, settings and maintenance
- ✓ Study of pressure losses with multi-turn valves
- ✓ Study of the balancing of heating networks with the help of control devices
- ✓ Study of the influence of balancing on the energies emitted.
- ✓ Carry out a power balance before and after balancing