

# Training Solution

## Building Automation

### Energy monitoring and seawater desalination



Recording of heat transfer



Reverse osmosis for seawater desalination

#### Benefits

##### Instrumentation

- Level
- Flow
- Pressure
- Temperature
- Conductivity
- Inductivity

##### Energy measurement

- Electrical
- Steam and heat

##### Data transmission

- 4-20mA
- Modbus
- Wireless HART
- OPC

##### Fully automated process

- Heating and heat consumption
- Water desalination

Endress +Hauser, the specialist for Process Automation, offers a training solution for building automation. It has been designed and developed by our training professionals of the Application Training Center in Reinach / Switzerland.

**Customer requirements** Typical processes in building automation shall be reproduced for the education of students. All processes shall be traceable and the energy consumption and energy efficiency must be monitored.

**Training solution** Transform electrical into thermal energy, transferring the thermal energy from one circulation loop into other loops and consume the energy in form of thermal radiation or as hot water.

The production of the required process water from seawater by reverse osmosis completes the package.

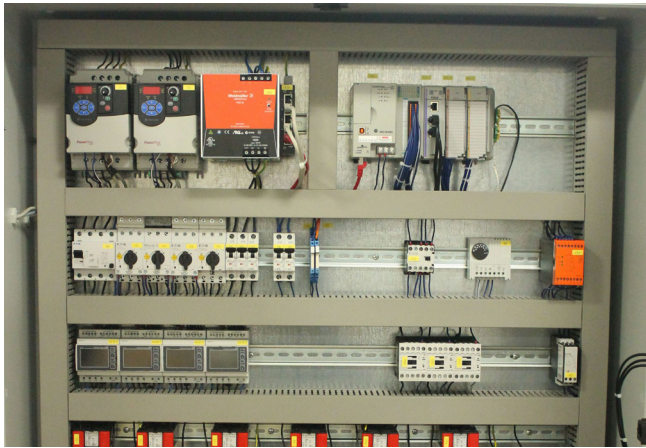
**Hardware** A heat pump uses electrical energy and extracts the thermal energy of the surrounding air to feed this into a heating loop. With a heat exchanger the thermal energy is transferred from the first loop into another heating loop where two radiators act as heat sink. An additional heat exchanger is used to heat up process water which can be extracted over a tap.

A membrane using reverse osmosis is filtering seawater so that it can be used as process water.

All energy streams, electrical and thermal, are measured and recorded.

The HMI is based on a client / server architecture with several clients, so that several students can work with the training rig at the same time.

Measured and calculated information are also made available over an Ethernet IP network connection, in OPC data format, for the use in additional third-party systems.



The training rig offers a sustainable learning experience, it is fully automatized with a distributed client / server HMI architecture

**The training rig includes:**

**Flow** Coriolis, ultrasonic, vortex and magnetic-inductive flowmeters plus calorimetric flowswitch

**Level** Capacitive, vibronic switch

**Pressure** piezoresistive pressure and differential pressure, pressure switch with metal membrane

**Analytical** Inductive and conductive measurement

**Temperature** PT100

**Electrical measurement** EngyVolt energycalculator

**Thermal measurement** RMS621

Steam and heat computer

**Actuators** Dimplex heat pump, Samson control valves, KSB high pressure pumps

**Consumers** Thermal heat radiation, radiator with fan, hot water tap

**System** Rockwell Automation Compact Logix

**Operation Software:** RSLogix5000, RSTalks Factory View

**Configuration tools:** Process display, Fieldcare

**Communication:** 4-20mA, Modbus, wireless HART

**Application Training Center**

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