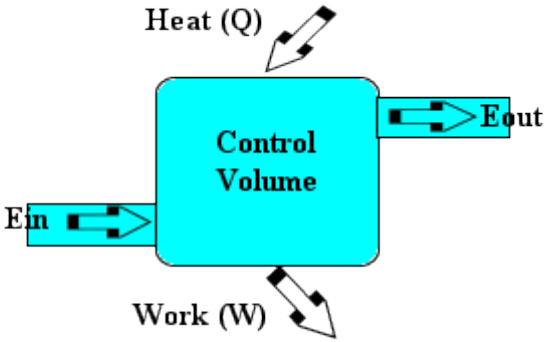
MODELING PRINCIPLE

Energy conversion devices such as boilers, turbines, turbo engines, pumps and compressors can be treated as steady flow devices that have one or more fluid streams entering and leaving a control volume. The most important presumption is that their stream properties at the inlet or outlet always remain the same regardless of time. In addition, they all obey the law of thermodynamics. This concept is presented in the following model along with the energy balance equation. This is the basis of all modeling presented in this program.

First Law for Steady Flow System



$$Q - W = E_{out} - E_{in}$$

$$\dot{Q} - \dot{W} = \sum_{out} (h + e_p + e_k)\dot{m} - \sum_{in} (h + e_p + e_k)\dot{m}$$

http://www.flowjoule.com

FLOWJOULE V3.1

Design and Analysis of Flows in Energy Systems

Program Highlights:

- Customize models for energy systems
- Optimize system parameters
- Evaluate energy losses in different fluid circuits.
- Determine cycle performance and efficiencies.
- A quick reference guide to property tables (Steam, Air, Liquids and Gases).
- Work with both Metric and USCS
- Model different fuel combustion processes
- Flue gas analysis with stoichiometry
- Helps conduct energy audit on day-to-day basis

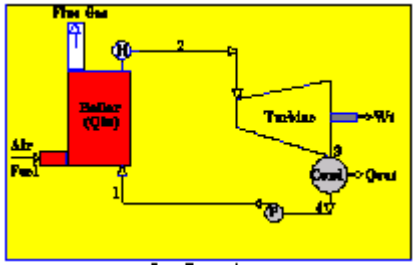
FJS MODELS

Flow joule system analysis models are categorized as follows.

- Rankine Cycle
- HVAC Cooling Cycle
- HVAC Heating Cycle
- Fluid Circuits (single stream)

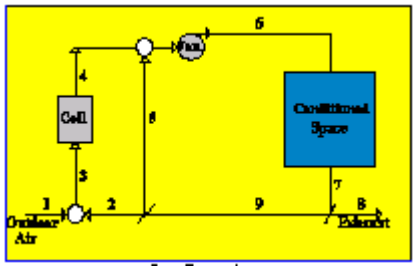
The program creates a generic model based on the above option. This generic model then can be expanded with custom data to suit a specific application. This specific application so-created can be saved for future modification.

RANKINE CYCLE



The above rankine cycle model is easily expandable to accommodate HP/IP/LP stages of turbine with re heaters, feed water heaters, and process heat supplies. All state numbers are reassigned and their properties are provided in a table. Its cycle performance with efficiency data is also provided in a separate table.

HVAC COOLING CYCLE

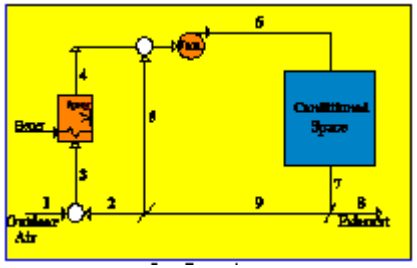


The above HVAC cooling model is expandable to accommodate different fan-coil process such as;

- Cooling and dehumidification
- Sensible cooling
- Evaporative cooling
- Cooling and humidification

State property table and cycle performance table are provided for the given conditioned space design. Conditioned space design includes estimation of both sensible and latent heat loads.

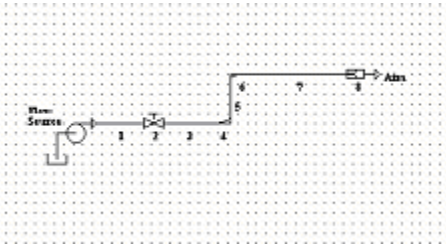
HVAC HEATING CYCLE



HVAC heating model is very similar to cooling cycle model except for the following fan-coil process.

- Heating and humidification
- Sensible heating.

FLUID CIRCUITS



The circuit consists of standard pipes and pipefittings, which is first created using the circuit builder, and then is transformed into a model. The component wise analysis is provided in a table, and the system summary provides the energy device specification along with ideal energy consumption data.

CONTACT

For more details, please visit **www.flowjoule.com** or contact:

M. K. Shenoy

1609 Cultivar Ln
Durham, NC-27713
Phone (919) 484-0363
Email: mks_us@yahoo.com