AMESim

LIBRARIES – AIR-CONDITIONING

KEY POINTS

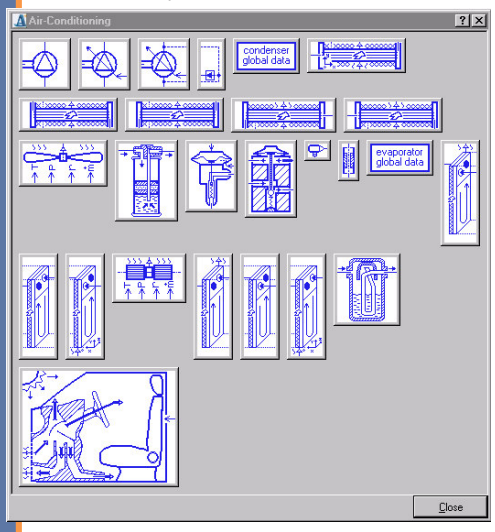
- Transient and Steady-State simulation.
- Composed of specific AC system global components.
- Fully based on the physics of two-phase flows.
- Geometrical description of heat exchangers .
- State of the art theory for the calculation of single phase or two-phase pressure losses.
- State of the art theory for the calculation of internal convective heat transfers in single phase or two-phase conditions (condensation or boiling).
- Easy initialization of the entire set of state variables of your system from the “charge and temperature” initialization facility, sensitivity anlysis on the amount of refrigerant introduced in the loop.
- Possibility to model external flow convective heat transfer with moist air (evolution of the air humidity, influence of the water vapor condenstation on the heat transfer, calculation of condensed water vapor mass flow rate).
- Possibility to model R134a, CO_2 ... systems, heat pump systems, multi-evaporation systems.
- Recognizable technological icons facilitating direct model identification with technical drawings.

Overview

Air-conditioning systems are most commonly found in passenger vehicles (cars, aircrafts, trains...) and buildings. They are also used in household appliances such as refrigeration and freezers systems.
A/C systems are used to respect certain constraints (ensure passengers’ comfort by controlling the temperature and the air humidity in the cabin, maintain temperature levels ...).
The AMESim Air-Conditioning Library is fully dedicated to the design of Air-Conditioning systems and permits:

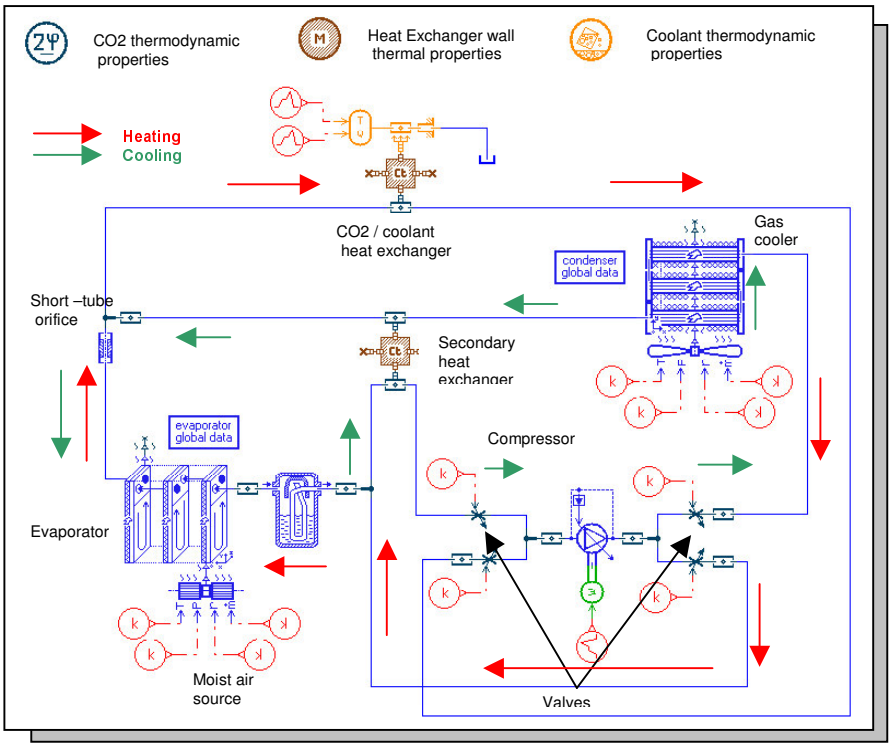
- The sizing of the refrigerant loop components (especially heat exchangers),
- The design and the test of current and new system configurations,
- The study of refrigeration loop stability and the testing of new control strategies,
- The evaluation of the Air-Conditioning system efficiency and its influence on the electric power or engine load, fuel consumption or pollutant emissions ...

This library is based on a transient heat transfer approach.



Benefits

The AMESim Air-Conditioning Library gives the user the capability to efficiently develop new design concepts, thanks to a large collection of components.
This library includes functions for multi-fluid systems and is fully compatible with the AMESim Thermal and Two-Phase Flow libraries.



Example of Heat Pump System configuration modeled using components from the Air-Conditioning Library. The switch between heating and cooling modes is done using controlled valves found in the Two-Phase Flow library.

Features

The AMESim environment and the Air-Conditioning library offer a number of capabilities in order to:

- Model thermodynamic cycles of refrigerant fluids.
- Size the influential components (heat exchangers, TXV, receiver-dryer ...).
- Study the influence of the component technologies.
- Proceed to cycle analysis (study the time response of the Air-conditioning system for which the compressor is submitted to a varying rotary speed).
- Proceed to sensitivity analysis, and component optimization.

Requirements

The AMESim Air-Conditioning library runs on Unix®, Linux® platforms and Pentium®-based PCs.

The AMESim Two-Phase Flow and AMESim Thermal libraries are required.

Air-Conditioning models

- Fixed displacement compressors.
- Variable displacement compressors (user-defined control of the displacement or with integrated internal valve).
- Compressor internal valve.
- Parallel flow condenser elementary geometry definition.
- Parallel flow condenser passes components (accounting for internal refrigerant flow, wall material and external moist air flow).
- Blower and fans (moist air sources).
- Receiver-dryer.
- TXV (Thermal eXpansion Valves) internally or externally controlled, geometrical or supplier characterization.
- Thermal sensing bulb.
- Short-tube orifice.
- U-channel plate evaporator elementary geometry definition.
- U-channel plate evaporator passes components (accounting for internal refrigerant flow, wall material and external moist air flow).
- Accumulator.
- Cabin model.

IMAGINE
www.amesim.com

Contact IMAGINE directly:

USA:	+1 734 207 5557
UK:	+44 18 69 351 994
France:	+33 (0)4 77 23 60 30
Germany:	+49 89 548 495 0
China:	+86 13818750986
Japan:	+81 (0) 3 3351 9691

E-mail: **info@amesim.com**

Visit **www.amesim.com** to obtain contact information for authorized IMAGINE representatives in other countries.

Release #1603