



# Additional Information | Albatross Energetics PS

## Compressor Modeling:

Block Parameters: Compressor	
Positive-Displacement Compressor (2P)	
Settings	Description
NAME	VALUE
Displacement specification	Volumetric displacement
> Displacement volume	130 cm <sup>3</sup> /rev
▼ Efficiency	
Efficiency specification	Analytical
Thermodynamic model	Isentropic
> Isentropic efficiency	0.65
> Nominal volumetric efficiency	0.9
▼ Nominal Conditions	
Nominal conditions specification	Nominal saturation temperatures
> Nominal evaporating temperature	5 degC
> Nominal condensing temperature	50 degC
> Nominal evaporator superheat	10 deltaK
▼ Parameters	
> Mechanical efficiency	0.9
> Inlet area at port A	pi*tube_D^2/4 0.00031416 m <sup>2</sup>
> Outlet area at port B	pi*tube_D^2/4 0.00031416 m <sup>2</sup>
Report when fluid is not fully vapor	None

- Nominal Volumetric Efficiency: **95%**
- Mechanical Efficiency: **92%**
- Nominal Evaporating Temperature: **5°C**
- Nominal Evaporator Superheat: **10K**
- Nominal Condensing Temperature: **50°C**
- Nominal Condenser Subcooling: **0K**
- Inlet Area (Stub Suction - 3/4" Dia): **2.85 cm<sup>2</sup>**

- Outlet Area (Stub Discharge - 1/2" Dia): **1.27 cm<sup>2</sup>**
- Nominal Speed: **2900 RPM**

	Scroll Compressor 1	Scroll Compressor 2	Scroll Compressor 3	Scroll Compressor 4
Suitable Refrigerants	R290	R134a, R407C, R513A, R454C, R1234yf	R134a, R407C, R450A, R513A	R410A
Isentropic Efficiency (%)	68.4%	68.8%, 69.1%, 67.5%, 67.9%, 64.8%	63.9%, 65.3%, 65.6%, 65.8%	65.1%
Displacement (at 50Hz, in cm <sup>3</sup> /rev)	33.1	45.5	33.1	22.8

### Expansion Device Modeling:

Block Parameters: Thermostatic Expansion Valve

Thermostatic Expansion Valve (2P) Auto Apply

Settings	Description	VALUE
Parameters		
Valve parameterization	Nominal capacity, superheat, and operating conditions	
Capacity specification	Mass flow rate	
> Nominal mass flow rate	0.005	kg/s
> Maximum mass flow rate	0.008	kg/s
Nominal pressure specification	Pressure at specified saturation temperature	
> Nominal condensing (saturation) tempe...	45	degC
> Nominal evaporating (saturation) temp...	5	degC
> Nominal condenser subcooling	5	deltaK
> Nominal (static + opening) evaporator s...	5	deltaK
> Static (minimum) evaporator superheat	2	deltaK
MOP limit	Off	
Pressure equalization	Internal pressure equalization	
<input type="checkbox"/> Bulb temperature dynamics		
> Leakage flow fraction	1e-6	
> Smoothing factor	0.01	
> Laminar flow pressure ratio	0.999	
> Inlet phase change time constant	0.1	s
> Cross-sectional area at ports A and B	pi*tube_D^2/4	0.00031416 m^2

- Nominal Mass Flow Rate = Volume Flow Rate x Nominal Density (*use the density of the superheated refrigerant entering the compressor at nominal conditions*)
- Nominal Evaporating Temperature: **5°C**
- Nominal (Static + Opening) Evaporator Superheat: **10K**
- Nominal Condensing Temperature: **50°C**
- Nominal Condenser Subcooling: **0K**
- Static (Minimum) Evaporator Superheat: **2K**
- Maximum Mass Flow Rate = Volume Flow Rate x Maximum Density (*you may use the density of the superheated refrigerant entering the compressor at high load conditions*)

*Use default values for leakage flow fraction, smoothing factor, laminar flow pressure ratio, inlet phase change time constant.*

## Evaporator/Condenser Modeling:

Block Parameters: Condenser Evaporator (2P-MA)1

Condenser Evaporator (2P-MA) Auto Apply

Settings Description

NAME	VALUE
<b>Configuration</b>	
Flow arrangement	Cross flow
Cross flow arrangement	Two-Phase Fluid 1 unmixed & Moist Air Fluid 2 mixed
> Thermal resistance through heat transfer surface	0 K/kW
> Cross-sectional area at port A1	0.01 m <sup>2</sup>
> Cross-sectional area at port B1	0.01 m <sup>2</sup>
> Cross-sectional area at port A2	0.01 m <sup>2</sup>
> Cross-sectional area at port B2	0.01 m <sup>2</sup>
<b>Two-Phase Fluid 1</b>	
> Number of tubes	25
> Total length of each tube	1 m
Tube cross section	Circular
> Tube inner diameter	0.05 m
Pressure loss model	Correlation for flow inside tubes
Local resistance specification	Aggregate equivalent length
> Aggregate equivalent length of local resistances	0.1 m
> Internal surface absolute roughness	15e-6 m
> Laminar flow upper Reynolds number limit	2000
> Turbulent flow lower Reynolds number limit	4000
Heat transfer coefficient model	Correlation for flow inside tubes
> Fouling factor	0.1 K·m <sup>2</sup> /kW
> Total fin surface area	0 m <sup>2</sup>
> Fin efficiency	0.5
Initial fluid energy specification	Temperature
> Initial two-phase fluid pressure	0.101325 MPa
> Initial two-phase fluid temperature	293.15 K
<b>Moist Air 2</b>	
Flow geometry	Flow perpendicular to bank of circular tubes
Tube bank grid arrangement	Inline
> Number of tube rows along flow direction	5
> Number of tube segments in each tube row	5
> Length of each tube segment in a tube row	1 m
> Tube outer diameter	0.05 m
> Longitudinal tube pitch (along flow direction)	0.15 m
> Transverse tube pitch (perpendicular to flow direction)	0.15 m
Pressure loss model	Correlation for flow over tube bank
Heat transfer coefficient model	Correlation for flow over tube bank
> Fouling factor	0.1 K·m <sup>2</sup> /kW
> Total fin surface area	0 m <sup>2</sup>
> Fin efficiency	0.5
> Initial moist air pressure	0.101325 MPa
> Initial moist air temperature	293.15 K
Initial humidity specification	Relative humidity
> Initial moist air relative humidity	0.5
Initial trace gas specification	Mass fraction
> Initial moist air trace gas mass fraction	0.001
> Initial mass ratio of water droplets to moist air	0
> Relative humidity at saturation	1
> Water vapor condensation time constant	1e-3 s
> Water droplets evaporation time constant	1e-3 s
> Fraction of condensate entrained as water droplets	1

- Flow Arrangement: Cross-flow  
(usually the case for fin-tube heat exchangers)

- Two-Phase Fluid 1

- Fin here means the fin in contact with the refrigerant - note that certain tubes may have fins internally. [Image 1](#), [Image 2](#)
- Usually in air conditioners, copper tubes used has no internal fins - in which case, total fin surface area = 0.
- Fouling Factor: **0.1 K·m<sup>2</sup>/kW**
- Fin Efficiency: **75%**

- Moist Air 2

- Fin here means the fin in contact with the air.
- Fouling Factor: **0.1 K·m<sup>2</sup>/kW**
- Fin Efficiency: **75%**

Use default values for internal surface absolute roughness, laminar flow upper Reynold's number limit, turbulent flow lower Reynold's number limit, water vapor condensation time constant, water droplet evaporation time constant.