

Software Information

General information

TESPy Version:	0.4.3-005 - Grassmann's Graph
Commit:	2df2b6a4@dev
CoolProp version:	6.4.0
Python version:	3.8.0 (default, Oct 28 2019, 16:14:01) [GCC 8.3.0]
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Parameter highlighting

Variable component parameters:	<i>italic</i>
Specified input parameter:	bold
Results of simulation:	normalfont

Equations are displayed for input parameters only.

1 Connections in design mode

1.1 Connection specifications and results

Table 1: Connection specifications and results

label	m in kg/s	p in bar (1)	h in kJ/kg	T in °C (2)	s in kJ/kgK
0	4.113	1.0000	369.12	-30.0	3.6792
1	4.113	1.0000	369.12	-30.0	3.6792
2	4.113	5.2500	554.20	153.8	3.7698
3	4.113	5.0000	433.65	35.0	3.4530
4	4.113	1.0500	344.81	-54.2	3.5599
11	9.945	1.0000	389.23	-10.0	3.7587
12	9.945	1.0000	379.18	-20.0	3.7197
21	7.909	1.5000	104.97	25.0	0.3672
22	7.909	1.5000	167.66	40.0	0.5723

1.2 Equations applied

$$0 = p - p_{\text{spec}} \quad (1)$$

$$0 = T(p, h) - T_{\text{spec}} \quad (2)$$

1.3 Specified fluids

Table 2: Specified fluids

label	Air (3)	water (4)
0	1.000	0.000
11	1.000	0.000
21	0.000	1.000

1.4 Equations applied

$$0 = x_{\text{Air}} - x_{\text{Air,spec}} \quad (3)$$

$$0 = x_{\text{water}} - x_{\text{water,spec}} \quad (4)$$

2 Components in design mode

2.1 Components of type HeatExchanger

2.1.1 Mandatory constraints

$$0 = \dot{m}_{\text{in},i} - \dot{m}_{\text{out},i} \quad \forall i \in [1, 2] \quad (5)$$

$$0 = x_{fl,\text{in},i} - x_{fl,\text{out},i} \quad \forall fl \in \text{network fluids}, \forall i \in [1, 2] \quad (6)$$

$$0 = \dot{m}_{\text{in},1} \cdot (h_{\text{out},1} - h_{\text{in},1}) + \dot{m}_{\text{in},2} \cdot (h_{\text{out},2} - h_{\text{in},2}) \quad (7)$$

2.1.2 Specifications and results

Table 3: Parameters of components of type HeatExchanger

	Q (8)	ttd_u	ttd_l	pr1	pr2
label					
Cooling heat exchanger	-100,000.00	20.00	34.15	1.00	0.95
Heat sink heat exchanger	-495,822.80	113.76	10.00	0.95	1.00

2.1.3 Equations applied

$$0 = \dot{m}_{in,1} \cdot (h_{out,1} - h_{in,1}) - \dot{Q} \quad (8)$$

2.2 Components of type CycleCloser

2.2.1 Mandatory constraints

$$0 = p_{in,i} - p_{out,i} \quad \forall i \in [1] \quad (9)$$

$$0 = h_{in,i} - h_{out,i} \quad \forall i \in [1] \quad (10)$$

2.3 Components of type Compressor

2.3.1 Mandatory constraints

$$0 = \dot{m}_{in,i} - \dot{m}_{out,i} \quad \forall i \in [1] \quad (11)$$

$$0 = x_{fl,in,i} - x_{fl,out,i} \quad \forall fl \in \text{network fluids}, \forall i \in [1] \quad (12)$$

2.3.2 Specifications and results

Table 4: Parameters of components of type Compressor

	P	eta_s (13)	pr
label			
Compressor	761,224.05	0.80	5.25

2.3.3 Equations applied

$$0 = -(h_{out} - h_{in}) \cdot \eta_s + (h_{out,s} - h_{in}) \quad (13)$$

2.4 Components of type Turbine

2.4.1 Mandatory constraints

$$0 = \dot{m}_{in,i} - \dot{m}_{out,i} \quad \forall i \in [1] \quad (14)$$

$$0 = x_{fl,in,i} - x_{fl,out,i} \quad \forall fl \in \text{network fluids}, \forall i \in [1] \quad (15)$$

2.4.2 Specifications and results

Table 5: Parameters of components of type Turbine

	P	eta_s (16)	pr
label			
Turbine	-365,401.26	0.80	0.21

2.4.3 Equations applied

$$0 = -(h_{\text{out}} - h_{\text{in}}) + (h_{\text{out},s} - h_{\text{in}}) \cdot \eta_s \quad (16)$$

3 Busses in design mode

3.1 Bus “power input”

This bus is used for postprocessing only.

Table 6: Results overview for bus power input

	\dot{E}_{comp}	$\dot{E}_{\text{comp,result}}$	\dot{E}_{bus}	$\dot{E}_{\text{bus,result}}$	η_{result}
label					
Turbine	$\dot{m}_{\text{in}} \cdot (h_{\text{out}} - h_{\text{in}})$	-365,401.26	$\dot{E}_{\text{comp}} \cdot \eta$	-351,507.97	0.96
Compressor	$\dot{m}_{\text{in}} \cdot (h_{\text{out}} - h_{\text{in}})$	761,224.05	$\frac{\dot{E}_{\text{comp}}}{\eta}$	791,311.29	0.96
total	-	395,822.80	-	439,803.32	-