Software Information

General information

TESPy Version:	0.5.1 - Exciting Exergy
Commit:	51ff17f2@dev
CoolProp version:	6.4.1
Python version:	3.8.10 (default, Nov 26 2021, 20:14:08) [GCC 9.3.0]
Documentation generated:	January 16, 2022

Parameter highlighting

Variable component parameters:	*italic*
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

$$0 = p - p_{\text{spec}} \tag{1}$$

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

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

$$0 = x_{\text{Air}} - x_{\text{Air,spec}} \tag{3}$$

$$0 = x_{\text{water}} - x_{\text{water,spec}} \tag{4}$$

2 Components in design mode

2.1 Components of type HeatExchanger

2.1.1 Mandatory constraints

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

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

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

2.1.2 Specifications and results

Table 3: Parameters of components of type HeatExchanger

label	Q (8)	ttd_u	ttd_l	pr1	pr2
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

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

2.2 Components of type CycleCloser

2.2.1 Mandatory constraints

$$0 = p_{\mathrm{in},i} - p_{\mathrm{out},i} \; \forall i \in [1] \tag{9}$$

$$0 = h_{\mathrm{in},i} - h_{\mathrm{out},i} \; \forall i \in [1] \tag{10}$$

2.2.2 Specifications and results

Table 4: Parameters of components of type CycleCloser

label	mass_deviation	fluid_deviation
Cycle closer	0.00	0.00

2.3 Components of type Compressor

2.3.1 Mandatory constraints

$$0 = \dot{m}_{\mathrm{in},i} - \dot{m}_{\mathrm{out},i} \; \forall i \in [1] \tag{11}$$

$$0 = x_{fl,\mathrm{in},i} - x_{fl,\mathrm{out},i} \; \forall fl \in \text{network fluids}, \forall i \in [1] \tag{12}$$

2.3.2 Specifications and results

Table 5: Parameters of components of type Compressor

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

2.3.3 Equations applied

$$0 = -\left(h_{\mathrm{out}} - h_{\mathrm{in}}\right) \cdot \eta_{\mathrm{s}} + \left(h_{\mathrm{out,s}} - h_{\mathrm{in}}\right) \tag{13}$$

2.4 Components of type Turbine

2.4.1 Mandatory constraints

$$0 = \dot{m}_{\mathrm{in},i} - \dot{m}_{\mathrm{out},i} \; \forall i \in [1] \tag{14}$$

$$0 = x_{fl,\mathrm{in},i} - x_{fl,\mathrm{out},i} \; \forall fl \in \text{network fluids}, \forall i \in [1] \tag{15}$$

2.4.2 Specifications and results

Table 6: Parameters of components of type Turbine

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

2.4.3 Equations applied

$$0 = -\left(h_{\mathrm{out}} - h_{\mathrm{in}}\right) + \left(h_{\mathrm{out,s}} - h_{\mathrm{in}}\right) \cdot \eta_{\mathrm{s}} \tag{16}$$

3 Busses in design mode

3.1 Bus "power input"

This bus is used for postprocessing only.

Table 7: Results overview for bus power input

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