

Block UBBHKWSG

Calculates the performance of a CHP system

This is the first version of UBBHKWSG by Maryam Zirak in January 2021. SG (BHKWWG) stands for *Stromgeführt* (Electricity driven). In this version, thermal and electrical efficiency are defined as parameter.

The efficiency curve in partial operation is defined as quadratic equation, $ax^2 + bx + c$. The coefficients, a,b and c, are defined as parameters in this model.

For heat-driven CHP, see [UBBHKWWG](#).



UBBHKWSG

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Inputs

- 1 Power Demand, kW
- 2 inlet Water temperature, feed to CHP, degree C
- 3 Output Water temperature,targeted for the heating network, degree C

Outputs

- 1 Mass flow of water,kg per hour
- 2 Heat generation, kW
- 3 Electric generation, kW
- 4 Fuel demand, cubic meters
- 5 Water temperature, outlet, degree C

Parameters

- 1 Nominal electric output performance, kW
- 2 Nominal heat output, kW
- 3 lower limit for output thermal power, per cent of nominal maximum thermal output
- 4 Coefficient a_1 for electrical efficiency (ele) curve when $ele = a_1x^2 + b_1x + c_1$ and x is the ratio of electrical output to nominal electrical output
- 5 Coefficient b_1 for electrical efficiency (ele) curve when $ele = a_1x^2 + b_1x + c_1$ and x is the ratio of electrical output to nominal electrical output
- 6 Coefficient c_1 for electrical efficiency (ele) curve when $ele = a_1x^2 + b_1x + c_1$ and x is the ratio of electrical output to nominal electrical output
- 7 Coefficient a_2 for thermal efficiency (n_{th}) curve when $n_{th} = a_2x^2 + b_2x + c_2$ and x is the ratio of electrical output to nominal electrical output
- 8 Coefficient b_2 for thermal efficiency (n_{th}) curve when $n_{th} = a_2x^2 + b_2x + c_2$ and x is the ratio of electrical output to nominal electrical output
- 9 Coefficient c_2 for thermal efficiency (n_{th}) curve when $n_{th} = a_2x^2 + b_2x + c_2$ and x is the ratio of thermal output
- 10 thermal efficiency at full load operation, per cent
- 11 electrical efficiency at full load operation, per cent
- 12 Heat capacity of Water or medium in CHP, kJ per kg per K
- 13 Fuel lower heating value, kWh per kg
- 14 Gas density, kg per cubic meters

Strings

None
