



**Swedish  
Stirling**

## Product information

### PWR BLOK 400-F - a unique solution

PWR BLOK 400-F is a unique proprietary solution in which Swedish Stirling's Stirling engines are used to harness energy from residual gas at metal and mining production. This allows for significant cost savings, as well as sizable reductions of carbon emissions. Thanks to the Stirling engine's external combustion, PWR BLOK is virtually indifferent to the type of gas being burned and fluctuations in the quality of the gas in question. PWR BLOK needs minimal maintenance (6,000h intervals), has an estimated lifetime of at least 25 years, and a quick payback time on the investment. It allows metal and mining manufacturers to reduce the volume of electricity purchased from the grid by up to 15 percent. PWR BLOK is a new recycling solution that produces 100 percent carbon-neutral electricity of industrial residual gases.

#### Facts about PWR BLOK 400-F

- Unrivaled cost efficiency in turning residual and flare gases to electricity.
- An integrated, non process critical, solution that is modular, robust, scalable and off-grid.
- Consist of 14 Swedish Stirling's Stirling engines and auxiliary equipment neatly stored in a standard container.
- Generates 400 kW.
- Reduces carbon emissions by ~3,500 tonnes/year through lower use of grid electricity. (ex. South Africa)
- Competitive without the need of government subsidies or grants
- "Plug and play" containerized solution enables low cost shipping and installation

## Performance analysis

**Example:** South African Ferrochrome Manufacturer

**Typical fuel composition:** CO (65%) - H<sub>2</sub> (13%) - CO<sub>2</sub> (8%) - O<sub>2</sub> (1%) - N<sub>2</sub> (13%)

#### FUEL

Calculated energy content: 9.05 MJ/Nm<sup>3</sup>

Minimum pressure: Ambient pressure + 15 kPa

#### STIRLING ENGINE

Typical efficiency: 30% <sup>1</sup>

Nominal output power: 30 kW <sup>1</sup>

Temperature dependency: -0.15%/°C

#### PWR BLOK

# of Stirling engines: 14

Daily operational scheme: 24 h

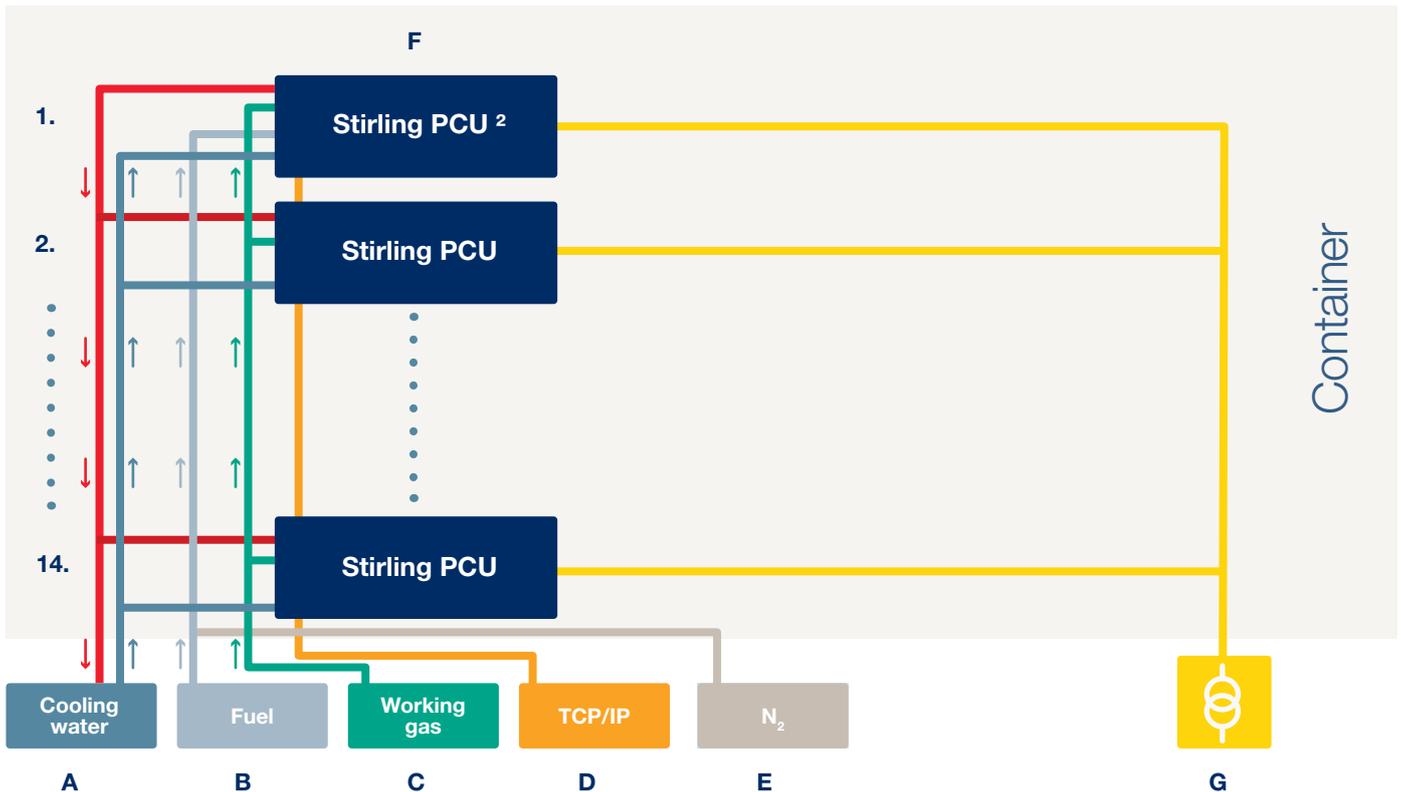
Nominal output power: 400 kW <sup>1</sup>

Annual energy generation: 3480 MWh <sup>1</sup>

Average fuel consumption: 560 Nm<sup>3</sup>/h <sup>1</sup>

<sup>1</sup> Fuel dependent

## Schematics of the Swedish Stirling PWR BLOK



**A** The PWR BLOK 400-F needs to be fed by a supply of cooling water. The total heat power to be transferred from the PWR BLOK is 700 kW.

**B** The fuel for the Stirling engines is a flammable gas. The fuel consumption when using the waste gas produced in the process of manufacturing FeCr, typically amounts to 560 Nm<sup>3</sup>/h at full output. This will vary with the exact composition of the fuel.

**C** The working gas inside the Stirling engine is He or H<sub>2</sub>. There is a small leakage of working gas that requires an external supply of pressurized gas. A stack of standard 20 MPa, 50 litre storage bottles can be fitted to the exterior of the PWR BLOK.

**D** The communication between the operator and the PWR BLOK is through a TCP/IP network.

**E** For safe operation and maintenance of the PWR BLOK, N<sub>2</sub> is needed for purging of the internal fuel system.

**F** The Stirling engines convert the heat generated by burning the off-furnace gas into a mechanical motion which is subsequently converted into electricity (400 VAC) via an alternator. The net efficiency is around 30 %.

**G** By an external transformer the 400 VAC output voltage may easily be transformed to the desired voltage.

<sup>2</sup> Power Conversion Unit

## Contact information

Dennis Andersson | Chief Marketing & Sales Officer

E-mail: [dennis.andersson@swedishstirling.com](mailto:dennis.andersson@swedishstirling.com)

For more information on PWR BLOK and Swedish Stirling AB, please visit [www.swedishstirling.com](http://www.swedishstirling.com)

