Sapphire TECHNOLOGIES

DATASHEET

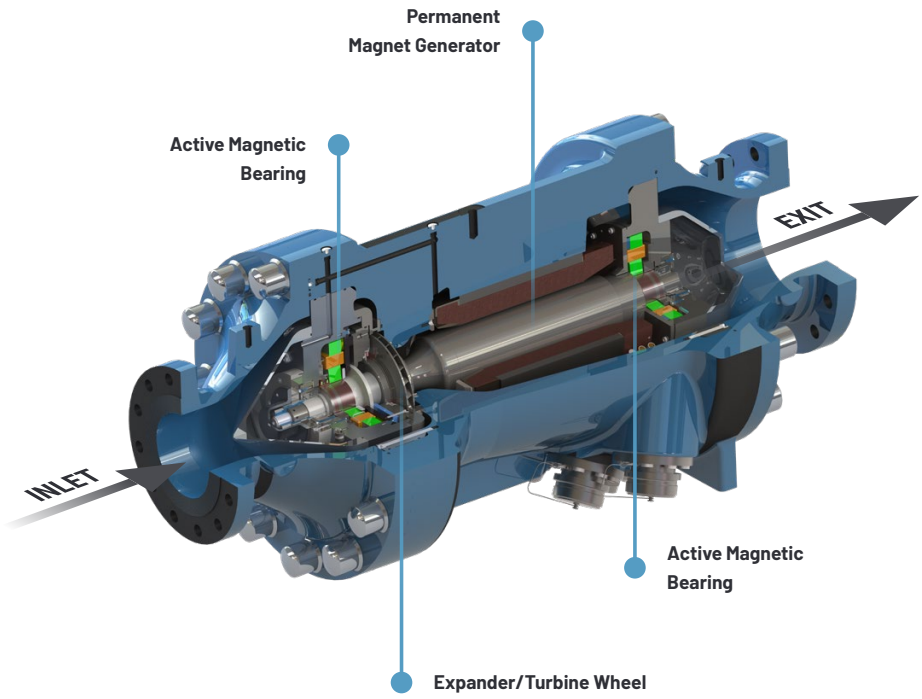
FREESPIN® IN-LINE TURBOEXPANDER

Integrated Power & Cooling Systems

Sapphire Technologies develops and manufactures modular power generation and cooling solutions for data centers, gas infrastructure, and utilities. FreeSpin® is a turboexpander-generator that runs on pressure, consumes no water or fuel, and generates zero greenhouse gas emissions. Since 2021, it has been deployed throughout the energy sector to deliver reliable, clean generation.

Designed to the strictest requirements of the oil and gas industry, the turboexpander-generator contains a high-performance, high-speed permanent magnet generator with an integrated radial in-flow expansion turbine and low loss active magnetic bearings. The expansion turbine uses high-pressure gas to drive an electric generator and create a stream of cooled fluid that supplies heat exchange capacity to onsite operations.

FreeSpin® may be skid-mounted at the factory and is available in modules of 300-kilowatts electrical generation with 5 million BTU per hour cooling capacity. These systems enable infrastructure owners to rapidly add new power and cooling capacity, improve operational efficiency, reduce carbon emissions, and lower electricity costs.



Power usage effectiveness. As separate systems, generation and cooling each add operational cost and inefficiency. FreeSpin's® integrated design delivers both clean electricity to servers and integrated cooling to coolant distribution systems, improving efficiency and reducing complexity.

Rapid deployment. FreeSpin® is a modular system designed for rapid deployment, converting pressure into on-site power and cooling with no added fuel or emissions. Built in and shipped from the United States.

Flexible Integration. Our systems are specified to site requirements, generating electricity where grid access is limited or unavailable. In microgrids, FreeSpin® generates reliable on-site power and operates independently or alongside other distributed energy resources.

Baseload power. FreeSpin® generates power and cooling from a constant energy source: pipeline pressure. With fast installation and commissioning timelines, introduce our systems to harden your energy supply with clean, baseline generation.

FreeSpin® Specifications

Eliminate capacity constraints:
Install and operate in months.

ELECTRICAL

Power Output, Max	300 kW (402 hp)
Voltage	3-phase, 380 to 480 V
Frequency	50 to 60 Hz
Generator	Permanent magnet

MECHANICAL

Operating Pressure, Max	110 bar-g (1,600 psi-g)
Operating Temperature[1]	-29 to 93 °C (-20 to 200 °F)
Bearing	Magnetic (dry type)
Overspeed Protection	Variable speed control
Capacity Control	External control valve

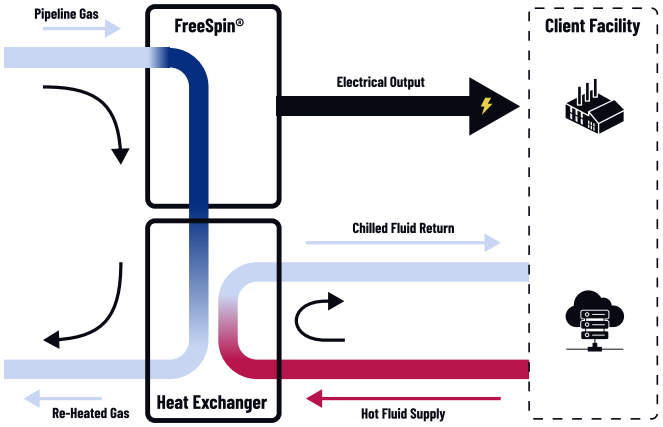
THERMAL

Cooling Output, Max	1,400 kW (5 MMBTU per hr)

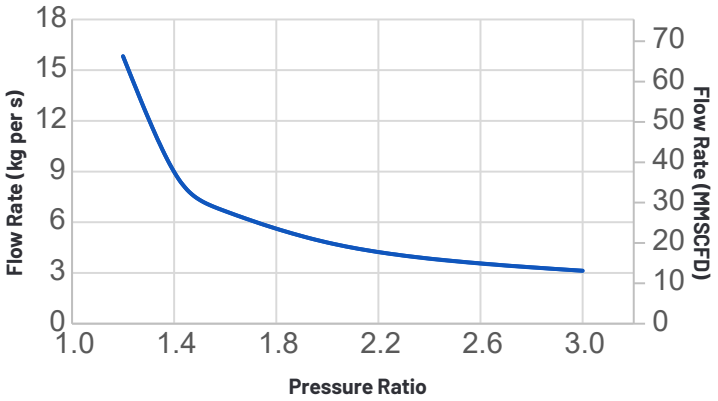
PHYSICAL

Axial Length	1,200 mm (60 in)
Diameter	600 mm (24 in)
Weight	1,200 kg (2,650 lb)
Codes and Standards	ATEX, UL 1741, CE

[1] Option available for operation to -50 °C (-58 °F).
[2] For natural gas service with 13 °C (55 °F) high-pressure gas.
[3] With 43 °C (110 °F) heat source.



300-kW Performance Curve[2]



5 MMBTU/hr Performance Curve[2,3]