**西门子SGT-400燃气轮机运行状况**

SGT-400 为双轴、简单开式循环、非回热式工业燃气轮机，设计为发电和机械传动之用。

我公司SGT-400燃气轮机发电机组是国内首台以焦炉煤气作为燃料的发电机组，燃料充分燃烧后产生升高温高压气体膨胀做功，推动动力涡轮高速旋转，经独立行星式减速装置变速后，通过联轴器连接发电机，带动发电机发电的发电装置。

2015年6月18日，两台机组相继投产运行。

2019年交换方式大修后投运。

截止2020年11月27日机组运行稳定，状态良好，为响应国家环保要求，主动停机至今，定时维护盘车。

**燃气轮机发电机组主要设备及技术参数如下：**

1. **燃气轮机：**

型号 SGT-400型

形式 简单开式循环、单轴、热端输出

转子旋转方向 逆时针（从输出端看）

进气装置 朝上安装的进气蜗壳和前轴承座外腔组成进气道

压气机 11级轴流亚音速，进口可转导叶，额定转速4100rpm

燃烧室 6个回流式管状燃烧室，每个燃烧室带1个高能点火器

涡轮 2级压气机涡轮（CT）,2级动力涡轮（PT）

轴承 4个可倾瓦径向滑动轴承，2个轴向止推轴承

排气装置 扩散段和水平安装的排气蜗壳

额定功率 12900KW/h

额定转速 9500r/min

压比 16.7:1

空气进气量 38.9kg/s

排气量 39.5kg/s

排气温度 555℃

额定单循环效率 35%

1. **减速箱与联轴器：**
2. 减速箱：独立行星式减速装置，减速后输出转速为1500r/min。从输出端看，它将动力轴逆时针方向反向成顺时针方向旋转输出。重量4030kg，是燃机和发电机安装定位基准。
3. 高速联轴器：齿轮型联轴器，它将动力涡轮输出轴适配器与齿轮箱的太阳小齿轮用螺栓连接耦合。
4. 低速联轴器：饶性金属盘式，将齿轮箱输出轴与发电机输出轴连接耦合。
5. **发电机：**

型号 QFR-15-4

形式 无刷励磁三相同步发电机

额定转速 1500r/min 冷却方式 空水冷

防护等级 IP54 绝缘等级 F/F

额定电压 10500V 额定电流 1031A

额定功率 15000KW 功率因数 滞后0.8

精致挠度 0.148mm 噪声等级 ≯85db

旋转方向 逆时针（从燃机端看）

飞轮转矩（GD²) 7750kg.m²

主发电机气隙 20mm

电机总重 45t

额定励磁电压 98V

额定励磁电流 8.7A

Siemens SGT-400 gas turbine operation

The SGT-400 is a twin-shaft, simple open-cycle, non-regenerative industrial gas turbine designed for power generation and mechanical transmission.

Our company's SGT-400 gas turbine generator set is the first domestic coke oven gas as fuel generator set, after the fuel is fully burned, the high temperature and high pressure gas expansion is generated to do work, promote the power turbine to rotate at high speed, after the independent planetary reduction device changes, the generator is connected through the coupling, and the generator is driven to generate power generation device.

On June 18, 2015, the two units were put into operation one after another.

In 2019, after the exchange method of overhaul , unit was put into operation again.

As to November 27, 2020, the unit has stable operation and good condition. In response to the national environmental protection requirements, it has actively stopped so far, and regularly maintained.

**The main equipment and technical parameters of gas turbine generator set are as follows:**

**1. Gas turbine:**

Model SGT-400

Form: Simple open cycle, single axis, hot junction output

Rotor rotation direction counterclockwise (from the output)

Air intake device The intake volute mounted towards the front housing and the outer cavity of the front bearing housing form the intake tract

Compressor 11-stage axial subsonic speed, imported transducible vanes, rated speed 4100rpm

Combustion chamber 6 reflux tubular combustion chambers, each with 1 high-energy igniter

Turbine 2-stage compressor turbine (CT), 2-stage power turbine (PT)

Bearings 4 tilt pad radial plain bearings, 2 axial thrust bearings

Exhaust device diffusion section and horizontally mounted exhaust volute

Rated power 12900KW/h

Rated speed 9500r/min

Pressure ratio 16.7:1

Air intake 38.9kg/s

Displacement 39.5kg/s

Discharge temperature 555°C

Rated single cycle efficiency 35%

**2. Gearbox and coupling:**

1. Gearbox: independent planetary reduction device, the output speed after deceleration is 1500r/min. From the output end, it rotates the power shaft counterclockwise to clockwise. With a weight of 4030kg, it is the benchmark for the installation and positioning of gas turbines and generators.

2. High-speed coupling: gear-type coupling, which couples the power turbine output shaft adapter with the solar pinion of the gearbox with a bolt connection.

3. Low-speed coupling: Rao metal disc type, the gearbox output shaft and the generator output shaft are connected and coupled.

3. Generator:

Model QFR-15-4

Form brushless excitation three-phase synchronous generator

Rated speed 1500r/min Cooling method Air water cooling

Degree of protection IP54 insulation class F/F

Rated voltage 10500V rated current 1031A

Rated power 15000KW power factor lag 0.8

Delicate deflection 0.148mm noise level ≯85dB

Direction of rotation counterclockwise (from the gas engine end)

Flywheel torque (GD²) 7750kg.m²

Main generator air gap 20mm

The total weight of the motor is 45t

Rated excitation voltage 98V

Rated excitation current 8.7A





