

OP-16 燃气轮机技术精湛结构简单

THE OP16 GAS TURBINE SOPHISTICATED SIMPLICITY

1.8 MW 的 OP16 燃气轮机采用工业全径流设计，具有稳定、可靠、高效和低排放优点。

OPRA 燃机可使用不同燃料提供分布式能源解决方案，适用于多种行业，如油气、工商业、垃圾发电和海上平台。双燃料和非标准燃料都可用。

OPRA 燃机在全球销售超过 130 台，发电机组累计运行时间超过 200 万小时，将继续推动世界能源形式的转变。

The 1.8 MW OP16 gas turbine has an industrial, all-radial design which provides robustness, reliability, highest efficiency, and low emissions.

OPRA Turbines can deliver distributed energy solutions from alternative fuel sources which are well suited for a variety of industries including Oil & Gas, Industrial & Commercial, Waste to Power, and Marine. Dual fuel and off-specification fuel options are available.

OPRA Turbines continues to drive the world’s energy transition with over 130 gas turbine generator sets worldwide accumulating over 2 million operating hours.

OP16 特点：

结构简单：单级离心压气机，单级向心透平
设计新颖：高速比行星减速齿轮箱
燃料适应性强：4 只筒形燃烧器，满足气、液双燃料应用，可在带负荷下切换
润滑油零消耗：悬臂式轴承支撑结构，热端无轴承
低排放：氮氧化物 NOx<25ppm
高效率：综合热效率>85%
可靠性高：年连续运转小时数>8000，大修周期>42500 小时

OP16 的主要优势 OP16’S KEY STRENGTHS

燃料灵活性
FUEL FLEXIBILITY

所需燃气压力低
Low fuel gas pressure required
低排放燃烧器可用
Low emission combustors available
低热值燃气适用
Low BTU fuel gases possible

可靠的设计
ROBUST DESIGN

全径向设计
All radial design
大修间隔 42500 小时
Overhaul only after 42,500 hours
轴承位于冷端
Bearings located in the cold section
灵活维护燃烧室
Easily accessible combustors

高热电联产能力
HIGH CHP CAPABILITY

排烟温度高
High exhaust temperature
高热电比
High heat to power ratio
烟气不含油
Oil-free exhaust flow guaranteed

占地面积小
SMALL FOOTPRINT

安装方便 (2 x 20 ft 集装箱)
Easy installation (2 x 20 ft containers)
紧凑、重量轻
Compact and low weight
运动部件少
Few moving parts
不需要冷却水
No cooling water needed



燃料灵活性 FUEL FLEXIBILITY

OP16 适用于多种燃料，包括如下：
The OP16 is suitable for a large range of fuels including the following:

高热值的气体
HIGH CALORIFIC GASES

天然气 Natural gas
火炬气 / 井口天然气 Flare gas/Wellhead gas
丙烷 Propane
LPG (液化石油气) 污染气体
LPG (Liquefied petroleum gas) Contaminated gas

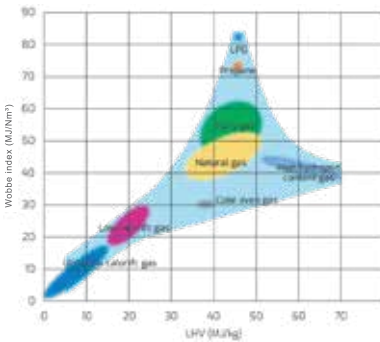
低热值和超低热值气体
LOW & ULTRA-LOW CALORIFIC GASES

合成气 Syngas
生物质气 Biogas
VOC (挥发性有机化合物)
VOC (Volatile organic compounds)
工业废气 Industrial waste gas

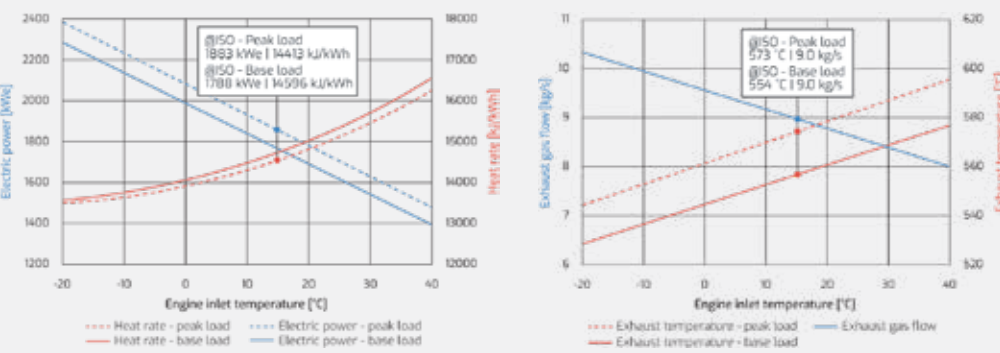
液体燃料
LIQUID FUELS

柴油 Diesel
热解油 Pyrolysis Oil
乙醇 Ethanol
凝析油 Condensate

燃料规格 FUEL SPECIFICATION



性能曲线 PERFORMANCE CURVES



OPRA 针对不同燃料特性，选用不同的经过验证的燃烧器，使效果达到最佳：
OPRA uses different well proven combustors to optimize specific fuels：
OP16-3A: 传统燃烧器
OP16-3A: Conventional combustor

OP16-3B: 干式低 NOx 燃烧器
OP16-3B: Dry low NOx combustor

OP16-3C: 低热值燃料燃烧器
OP16-3C: Low calorific fuel combustor

供货范围 Scope of Supply

标准发电机组 Standard Generator Package
钢结构底盘 Steel base frame
液压起动系统 Hydraulic starting system
天然气燃料系统 Natural gas fuel system
滑油系统 Lubrication oil system
齿轮驱动主油泵 Gear driven main oil pump
交流辅助润滑油泵 AC pre/post lube oil pump
集成空冷式冷油器 Integrated air/oil cooler
润滑油箱加热器 Lube oil tank heater
双联滤油器 Duplex oil filter
带静态滤芯的过滤通风系统
Air filtration and ventilationsystem with static filter
风雨罩 Weatherproof acoustic
外壳 enclosure (Lp=80dBA @ 1m)

可选设备 Optional Equipment
发电机可选品牌 Generator brand options
西门子或 AB 控制系统
Siemens or Allen-Bradley controls
不同电压等级可选 Alternative voltages
待机功率 Standby ratings
液体燃料系统 Liquid fuel system
双燃料系统 Dual fuel system
生物气、合成气等燃料系统
Fuel system for biogas, synthetic gas, etc.
干式低排放系统 Dry low emission system
红外燃气检测系统 IR gas detection system
可用于非稳态基础的三点式底座
3 point skid for unstable foundations

■ OP16 燃机 OP16 GAS TURBINE
悬臂式转子 Overhung rotor
单级离心压气机
Single stage centrifugal compressor
单级径向透平 Single stage radial turbine
4x 筒形燃烧器 4 can combustion system
高能电火花点火系统
High energy spark ignition system
■ CONTROL CABINETS 控制柜
基于 PLC 的基础控制系统 PLC based control system
发电机自动同步和保护
Generator auto synchronizing and protection
振动监测 (发电机和减速齿轮箱)
Vibration monitoring (Generator and gear reduction)
控制系统配有 24VDC 备用电池
24VDC backup battery for control system

■ GENERATOR 发电机
3 相 4 极同步 Synchronous 4-pole, 3 phase
开式防滴结构一体化无刷励磁机
Open drip proof construction Integral brushless exciter
集成固态 AVR H 级绝缘
Integrated solid state AVR H-class insulation
H 级温升 H-class temperature rise
■ GEAR REDUCTION 齿轮减速箱
行星齿轮
Integral epicyclical gear
输出速度 1500 或 1800 转 / 分
Output speed 1500 or 1800 rpm
辅助驱动轴 Ancillary drive shafts
驱动端剪切销保护
Shear pin drive shaft protection

油雾分离器 Oil demister
防冰堵进气滤清器 Inlet filter anti-icing
分体式控制室 Detachable control room
烟气直排或余热回收 Exhaust or WHR options
压气机清洗系统 Compressor washing system
天气罩 Weather hoods
光学火焰监测 Optical flame monitoring
不同运行环境温度 (-20 / + 40° C 适中，
-60 / + 30° C 极寒, 0 / + 50° C 沙漠)
Different temperature options (-20/+40°C Moderate, -60/+30°C Very cold, 0/+50°C Desert)
自清洗过滤器 Self cleaning filters
维修平台 Maintenance platform
发电机自动润滑 Automatic generator lubrication

包装尺寸 PACKAGE DIMENSIONS



25000kg I 55,1151lb 的质量取决于具体配置
(25000kg - 32,000kg I 55,115lb ~ 70,548lb)
Mass of the unit 25,000kg I 55,115lb depending on particular configuration
(25,000kg to 32,000kg I 55,115lb to 70,548lb)



WUXI HUARUI 无锡华瑞项目
2 x OP16-3B



LOMO BILLIONS 河南伯利联项目
1 x OP16-3B



JINAN LINUO 济南力诺项目
2 x OP16-3B



Dalian Energas Turbine Technology Co., Ltd established in January 2017, is located in Dalian Economic and Technological Development Zone, covers an area of 15,000 square meters. It focus on gas turbine engine, components and application system development, production, sales and service. As the core of Energas own OP16 and KG5, relying on OPRA Turbines' s technology research and development capabilities in the Netherlands, realized the small gas turbine localization, become a handful domestic enterprises which has full set technology of small gas turbine. Its related products are widely used in petrochemical, industry, Marine engineering, distributed energy, portable power and other field and committed to providing customers with gas turbine system design, auxiliary system design, product development, manufacturing and other services. Since its establishment, bearing the social mission to promote the development of China's small gas turbine, with the heart of the unremitting struggle and high sense of responsibility, contributing to create independent brand of the Chinese nation in the future.

研发设计制造
核心人员构成

Core personnel of R&D,
design and manufacturing

国内研究院校
国外专业团队

Domestic research
institutions Foreign
professional teams

燃机行业资深
机械师

Senior mechanical
engineer in gas
turbine industry

燃机相关专业
研究生

Gas turbine related
postgraduate

吸收派思燃气
优秀人才

Absorb talents from
Energas gas fuel
company

全球客户服务 GLOBAL CUSTOMER SERVICE

24小时紧急支援
24-hour emergency support

远程监测
Remote condition monitoring

服务水平的培训认证
Service level training certification

安装调试
Installation and commissioning

大修
Major overhauls

3级服务协议
3 level service agreements

现场服务和检查
Field service and inspections

产品改进和升级
Product enhancements and upgrades



Advantages of (Gas Turbine) Mobile Power Supply Unit 移动电源车的优点

全路况的适应性
车辆在公路上行驶，燃机受到大量的颠簸和震动。EGTM 系列针对性的设计了阻尼减震设备，提高了机组的可靠性。

低重心和高机动性
燃机重量较轻，重心相对较低，使车辆拥有了更好的机动性。

整体紧凑性
所有必须设备都整合在车内，包括燃油箱、电池、排烟消音器、进气滤芯、电缆等，车体带有铝制罩壳。并有足够的空间用于维护检修。

黑启动、快速冷启动可靠性
不需要外部供电、供油，电源车就可以黑启动提供电力。不需要长时间预热，满足在低温环境下的快速启动发电。

Adaptability of All Terrain
When the vehicle is on the road, the gas turbine will suffer a lot of bumps and shocks. The EGTM series equipped with a special damping device, improve the reliability of the unit.

Low Center of Gravity and High Mobility
Gas turbine has a relatively lighter weight and lower center of gravity which makes the vehicle has a better mobility.

Overall compactness
All necessary equipment is integrated in the car, including fuel tank, battery, exhaust silencer, air intake filter, and cable etc. Otherwise, there is aluminum shell and enough space for maintenance in the car.

Black Start and Fast Cold Start
No external power and fuel supply required, it can black start to provide electricity. Short Warm-up before the cold start under low temperature environment.

20 尺标准集装箱，易于运输、安装和调试

20 feet standard container:
Easy to transport, install and commissioning

围绕派思自有的 OP16, KG5 等小型燃气轮机为核心，发挥其结构简单小巧，运行稳定可靠的优势，研制适应野外机动的移动电源车。为偏远缺电地区的户外作业提供可靠的电力保障。

Energas Mobile Power Supply Truck is designed based on the Energas owned OP16, KG5 and other small size gas turbine. Due to the compact size and structure, reliable operation advantage, Energas Turbine researched and developed the Mobile Power Supply Truck to fit the outdoor usage and provide reliable power supply for remote area.

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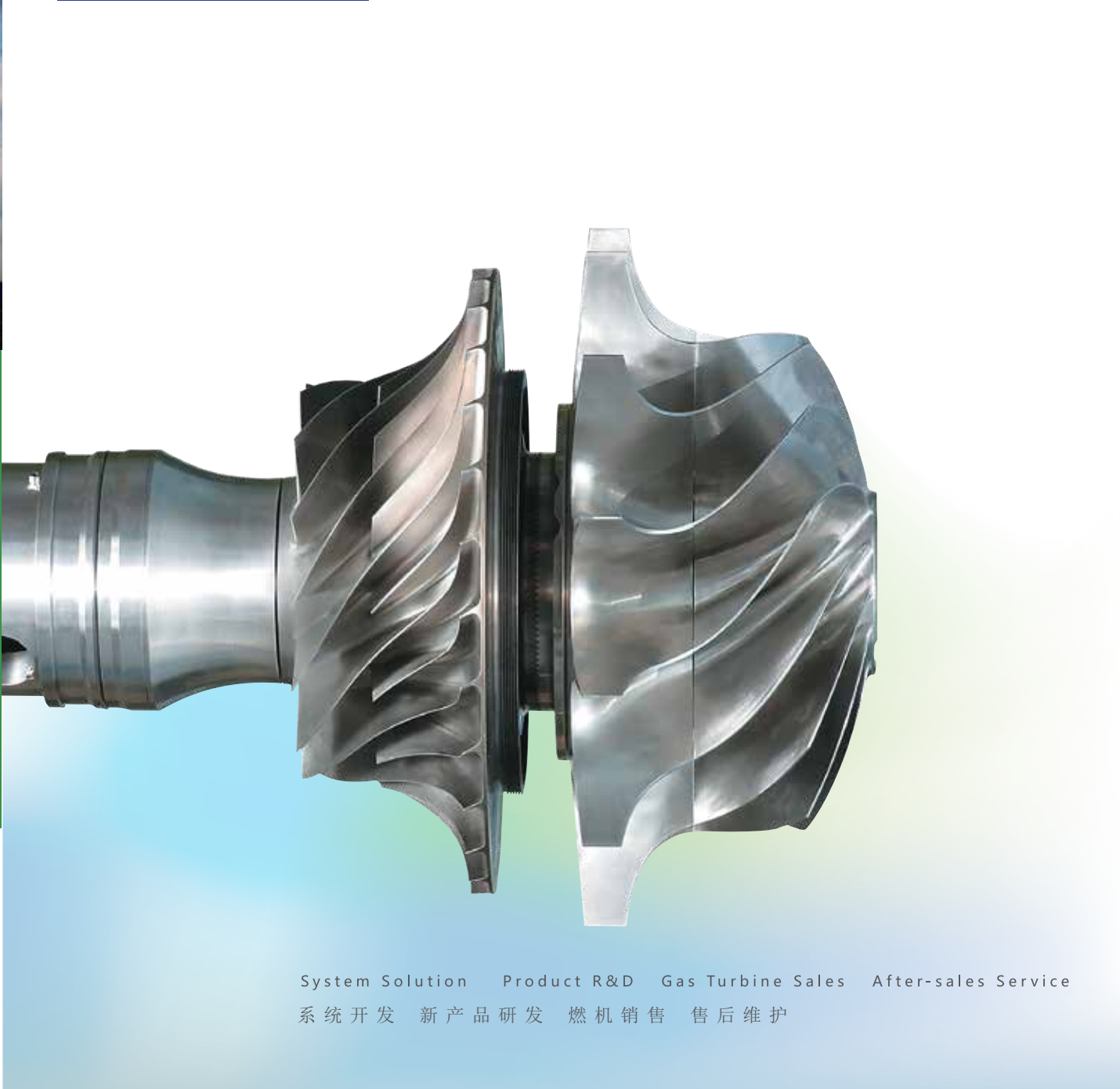
地址: 大连经济技术开发区振鹏工业城73号
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Economic and Technological Development Area



Energas Group
派思集团

推动世界能源转型
最理想的径向燃气轮机

DRIVING THE WORLD'S
ENERGY TRANSITION
OPTIMAL RADIAL
GAS TURBINE



King Olav V of Norway with Jan Mowill and the KG2 in 1969

1991 年，Jan 和 Hiroko Mowill 创办 OPRA 燃机公司，Jan Mowill 曾在一个大型的挪威工业集团领导燃机部门，1964 年他开发和商业化世界上第一个工业应用的径向燃气涡轮机。

OPRA Turbines was founded by Jan and Hiroko Mowill in 1991. Jan Mowill had previously led the gas turbine division at a major Norwegian industrial conglomerate where he developed and commercialized the world' s first radial gas turbine engine for industrial applications in 1964. OPRA Turbines sold its first commercialized gas turbine package in 2005. In 2017 OPRA Turbines opened a new state of the art headquarter facility in Hengelo (NL) to further strengthen and increase production capacity following recent growth in business.

An Energas Group Company

废物发电
WASTE TO POWER

Biogas 生物质气
Syngas 合成气
Pyrolysis oil 热解油
Industrial off-gases 工业尾气
Ammonia plants 耐氨植物
Fertilizer plants 化肥厂
Methanol plants 甲醇厂
VOC utilization 挥发性有机化合物的利用率
Landfills 垃圾填埋

油气
OIL AND GAS

Flare gas 火炬气
Upstream 源头
Onshore in remote sites 陆上远程站点
Offshore platforms 海上平台
Midstream 中间过程
Pipelines and oil 管道和石油
tankers 油轮
Downstream 终端
Refineries 炼油厂
FPSO' s 浮式钻井平台

工商业
INDUSTRIAL & COMMERCIAL

Pulp & paper 造纸
Food processing 食品加工
Ceramic 陶瓷
Chemical 化学
Rubber 橡胶
Gypsum 石膏
Hospitals 医院
Hotels 宾馆
Universities 高校
Shopping centers 购物中心
Pharmaceutical 制药
Data centers 数据中心

海洋工程
MARINE

Tankers 油轮
VOCs 挥发性有机化合物
Military 军事
On-board power 船上发电
Cruise ships 游艇

可移动电源
MOBILE POWER

Mobile power Supply truck
移动电源车

燃气轮机应用领域 APPLICATION AREA

System Solution 系统开发
Product R&D 新产品研发
Gas Turbine Sales 燃机销售
After-sales Service 售后维护

