
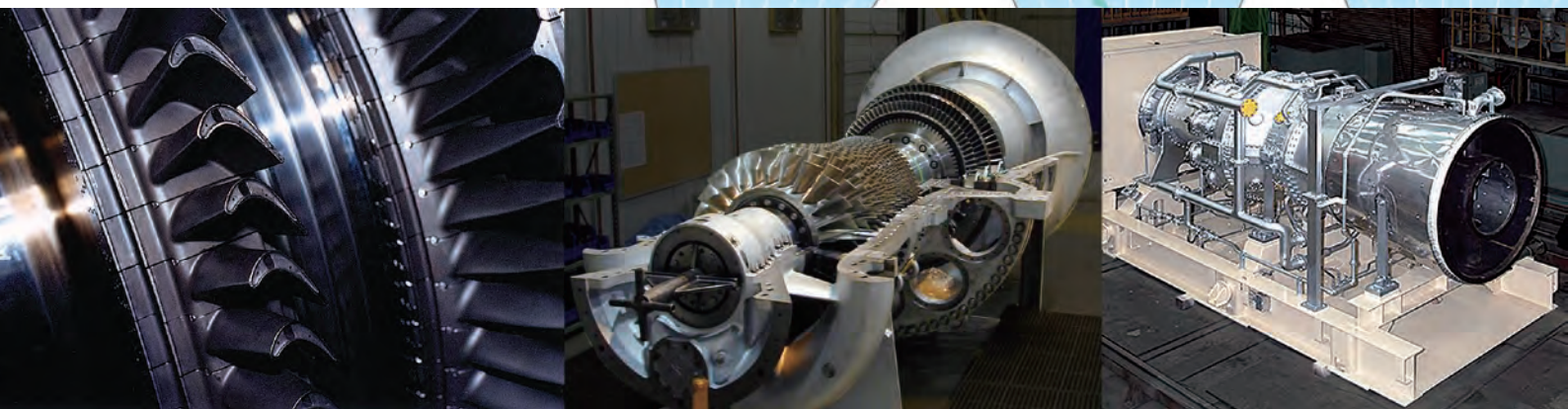


HITACHI
Inspire the Next

HITACHI
H-25/H-15
GAS TURBINE



The H-25/H-15 Gas Turbine A Product of Hitachi Quality



The H-25's fuel savings will repay your investment within a few years while allowing you a range of fuels from distillate to natural gas. And with cogeneration or combined cycle plants, even higher efficiency will be achieved. Plus an excellent automation system will add ease and precision to your operations after a fast installation.

Excellent engineering, superior quality control, and reliable service has earned Hitachi gas turbines a reputation for excellence and efficiency. With an output of 30MW class and, coupled with the latest in gas turbine technology, Hitachi's H-25 becomes a superior value. H-15 gas turbine is scale down model H-25 gas turbine. (17MW class)

Features

- 34.8% (LHV base) Gas Turbine Thermal Efficiency with Advanced Technology
- High Reliability and Easy Maintenance with Heavy Duty Design
- High Fuel Flexibility with Low Emission Level
- Quick Delivery and Easy Installation
- Fully Automated Digital Control
- Applicable to Replacing Existing Old Gas Turbine with New H-25
- Suitable for Cogeneration, Combined Cycle Power Plant and Motor Driven Compressor Drive
- Maintenance Support for Customer's Satisfaction

Performance— Simple Cycle

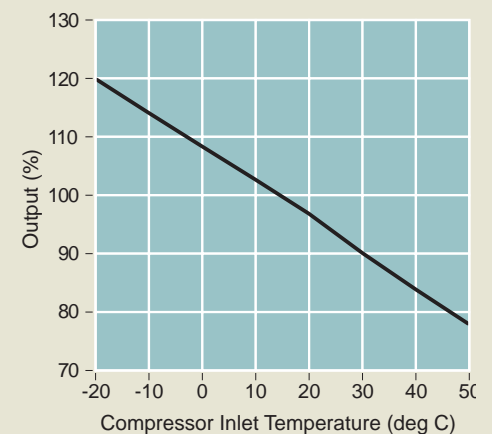
Performance

ITEM	UNIT	H-25	H-25	H-15
		Natural Gas	Distillate Oil	Natural Gas
Output	kW	32,000	31,000	16,900
Efficiency	%(LHV)	34.8	33.9	34.3
Heat Rate	kJ/kWh	10,350	10,610	10,500
	Btu/kWh	9,806	10,157	9,950
Exhaust Flow	kg/s	96.6	96.6	52.9
Exhaust Temp	deg C	561	561	564

ISO Condition (Ambient Temperature: 15 deg C)
Conventional Combustor case

Correction Curve

Effect of compressor inlet temperature on maximum output (Base load)



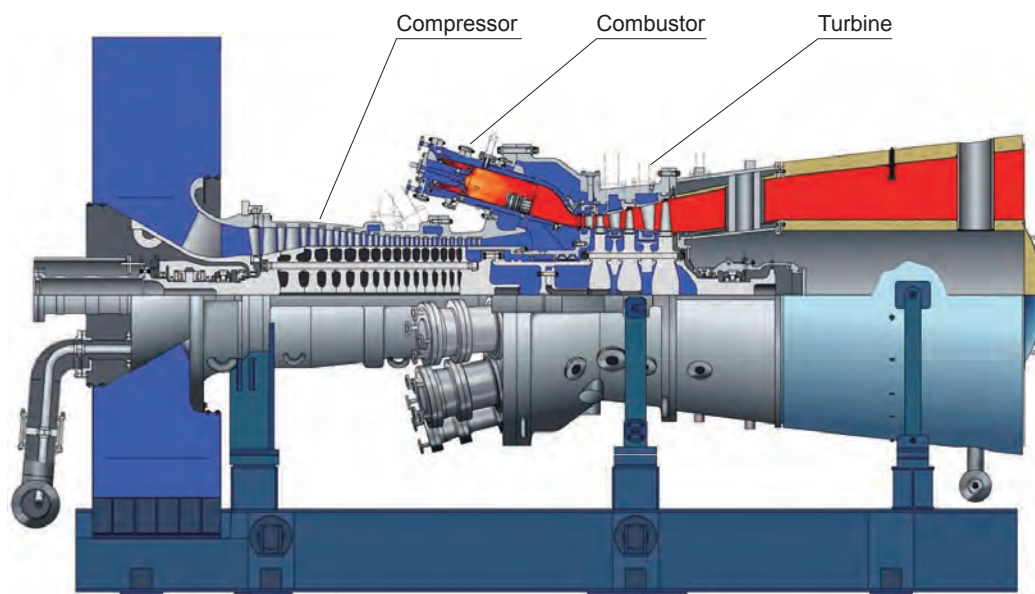
NOx Emission

Combustor	Fuel	NOx Abatement	Injection Flow (%*1)	NOx ppm (15% O ₂)
Conventional Combustor	Natural Gas	—	0	188
		Steam	2.5	53
		Water	3.0	25
	Distillate Oil	—	0	264
		Steam	2.5	74
		Water	3.0	42
LNC (Single Fuel Type)	Natural Gas	—	0	25
LNC (Dual Fuel Type)	Natural Gas	—	0	25
	Distillate Oil	Water	2.5	42

Note: *1 : Mass flow ratio to inlet air
Ambient Temperature : 15 deg C
Relative Humidity : 60%
Operation Condition : Base Load LNC : Low NOx Combustor

Specification— Major Components

The control compartment, gas turbine package, generator package, and generator auxiliary compartment make up the H-25 gas turbine generator set for 50 and 60 Hz application.




Specification

Components		Design
Gas Turbine	Type	Heavy Duty Design
		Simple Cycle
		Single Shaft
		Horizontal Split Casing, Stacking Rotor
		Rotating Speed H-25 : 7,280rpm / H-15 : 9,710rpm
Compressor	Type	17 Stages Axial Type
Turbine	Type	3 Stages Impulse Type
	Cooling	Air Cooled 1st and 2nd Stage Nozzle and Bucket
Combustor	Type Liner Cooling	Reverse Flow Type
		Conventional Type or Low NOx Type (25ppm) Combustor
		H-25 : 10 Combustors / H-15 : 6 Combustors
		Slot Cooling

The Advantages of Replacement

The H-25 Gas Turbine can be used, not only to create new, highly efficient power plants, but also to replace the Old Machine, gaining an immediate 20% reduction in fuel consumption. Transported separately, the combination with the re-utilized existing equipment is done at the installation site. And when replacing an existing Old Machine with the H-25, the replacement can be performed in a short period, because existing foundations, building works, and ancillary equipments are compatible.

Replacement Experiences of Old Machines



Country : Bahamas
Number of unit : Four(4)
Operation date : 2002, 2003, 2005, 2007



Country : Japan
Number of unit : One(1)
Operation date : Nov., 1988



Country : Nigeria
Number of unit : Six(6), Six(6)
Operation date : 2002, 2005

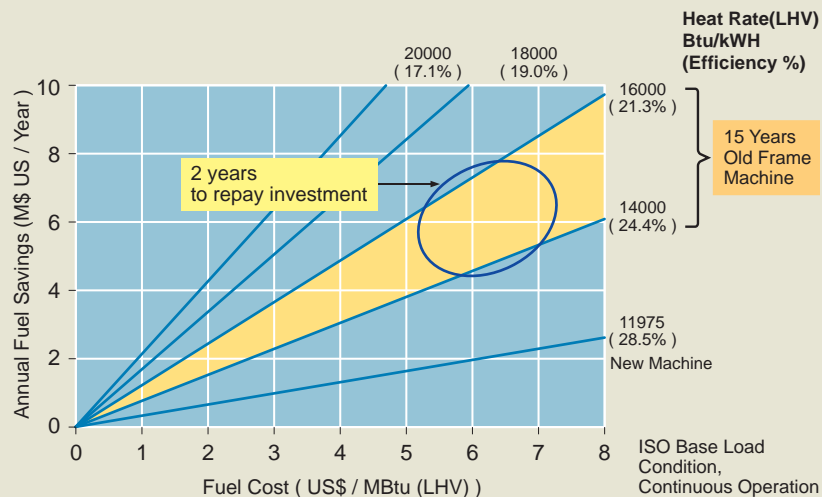


Country : Iraq
Number of unit : Three(3)
Operation date : 2007



Country : Iraq
Number of unit : Two(2)
Operation date : 2007

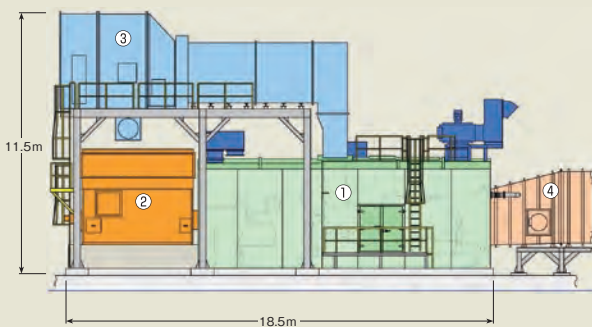
Typical Annual Fuel Savings by Replacing with H-25



Modular Package Design

The control compartment, gas turbine package, generator package, and generator auxiliary compartment make up the H-25 gas turbine generator set for 50 and 60 Hz application.

H-25

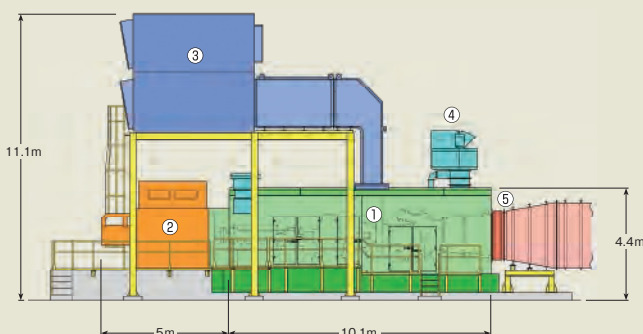
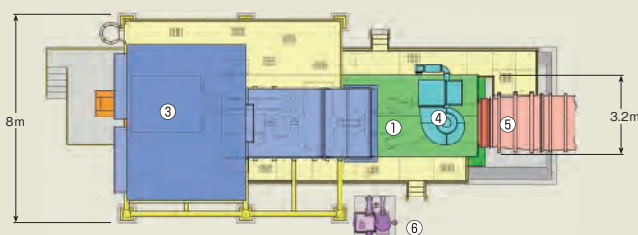


Major Components with Compact Package Design

- Minimizes Site Installation Work and Period
- Flexible Site Layout
- Easy Handling and Transportation

No.	Package	Weight
1	Gas Turbine + Base	47 t
	Lube Oil Tank, Reduction Gear and Auxiliaries	82 t
2	Generator	85 t
3	Air Intake System	51 t
4	Exhaust System	7 t

H-15



No.	Package	Weight
1	Gas Turbine + Base	30 t
	Auxiliary Equipment	49 t
2	Generator	37 t
3	Air Inlet System	33 t
4	Ventilation Fan	1 t
5	Exhaust System	5.6 t
6	Mist Separator	1.5 t

Application

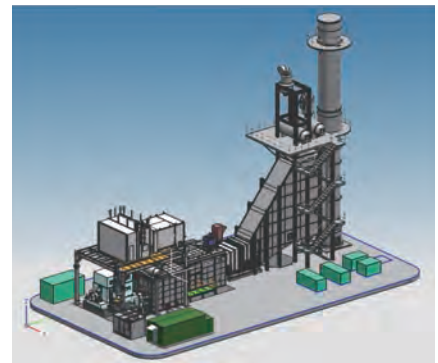
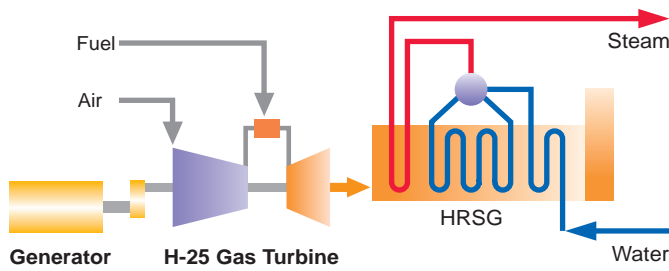
1 Cogeneration Plant

The high efficiency H-25 gas turbine offers users very high thermal efficiency, high reliability, and easy maintenance. Applicable to various cogeneration systems, Hitachi provides system engineering to meet various heat and power requirements to optimize the design.



H-25 Gas Turbine Cogeneration Plant (Oman)

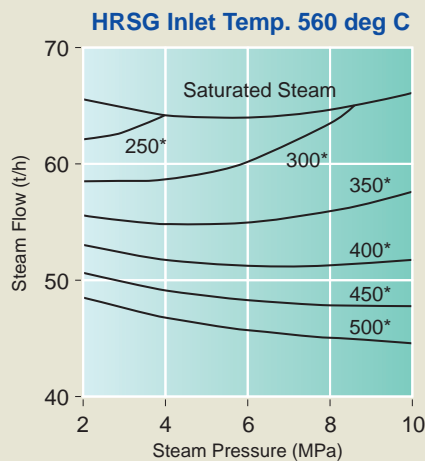
System Configuration



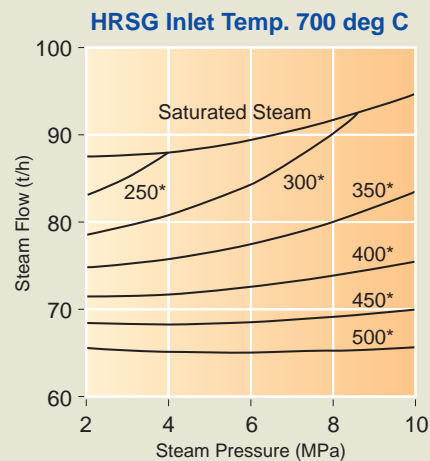
Typical Performance

Power Output	29,910 kW
Heat Output	(6 MPa/300 deg C) 60 ton/hr
Overall Efficiency	More than 80% (LHV)

UNFIRED Steam Production



FIRED Steam Production



*: Steam Temperature (deg C)

Application

2 Combined Cycle Plant

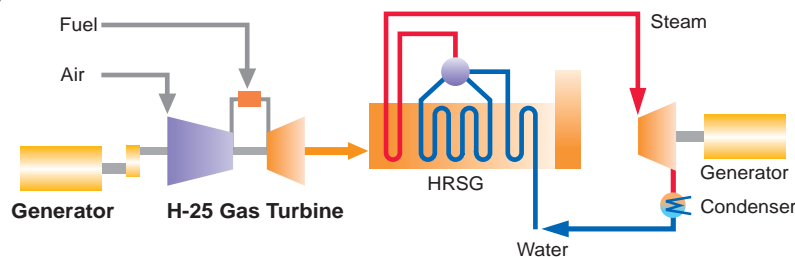
The higher operating temperature of gas and steam cycles makes an H-25 combined cycle power plant achieve high efficiency generation. By creating a packaged type combined cycle plant, Hitachi makes installation, operation, and maintenance an easy part of your power generation.



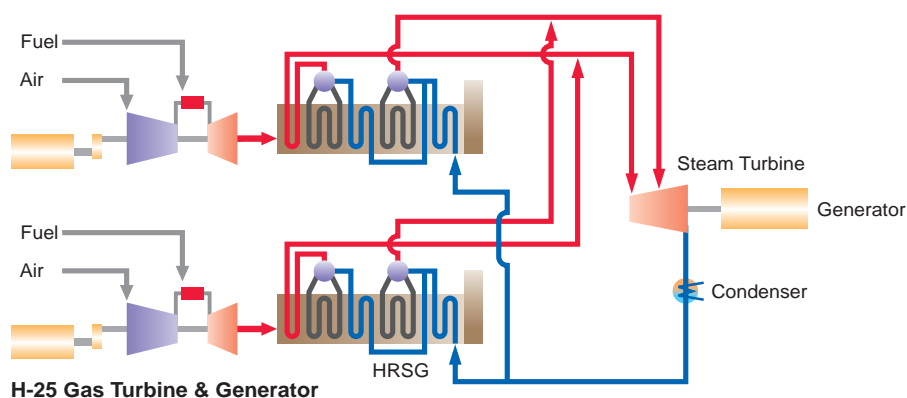
H-25 Gas Turbine Combined Cycle Plant (Japan)

System Configuration

1025 (1-1-1)



2025 (2-2-1)



Combined Cycle Standard Performance

Type	Type	Type (GTG-HRSG-STG)	
		1025(1-1-1)	2025(2-2-1)
Total Output	kW	43,760	87,800
Gas Turbine Output	kW	29,730 × 1	29,730 × 2
Steam Turbine Output	kW	14,030	28,340
Plant Efficiency	%(LHV)	50.1	50.3

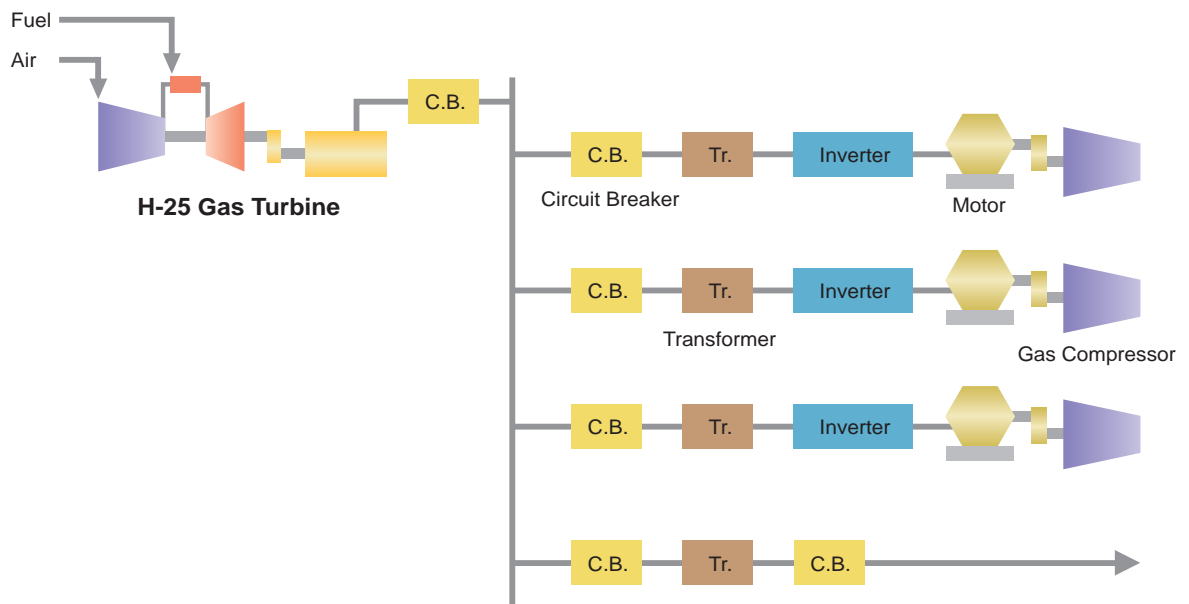
● Natural Gas, ISO Base Load Operation

Application

3 Motor Driven Compressor Drive

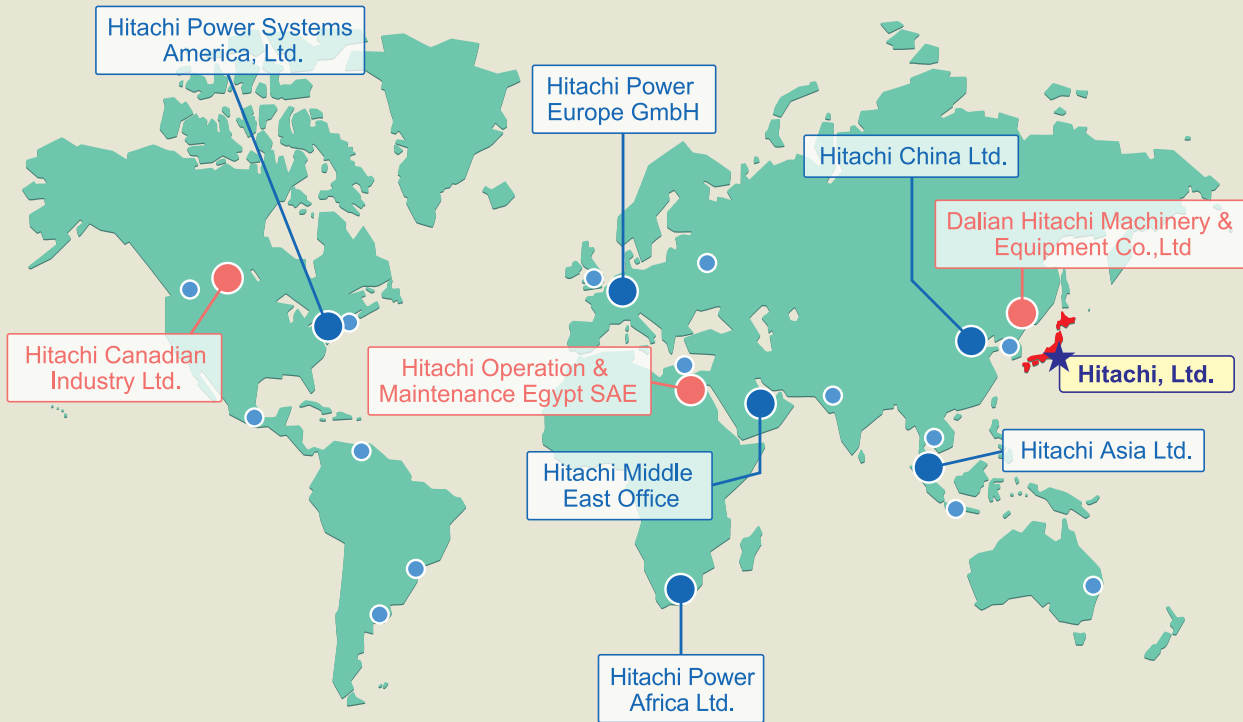
- Higher response & easy speed control with 50-105% control range
- Flexible selection of gas compressor sizing
- Less maintenance

System Configuration

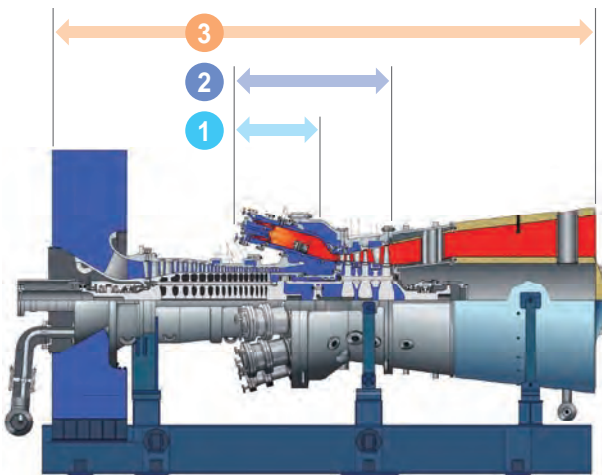


H-25 Gas Turbine Project (Indonesia)

Hitachi Turbine Global Service



Periodical Shut-down Inspection

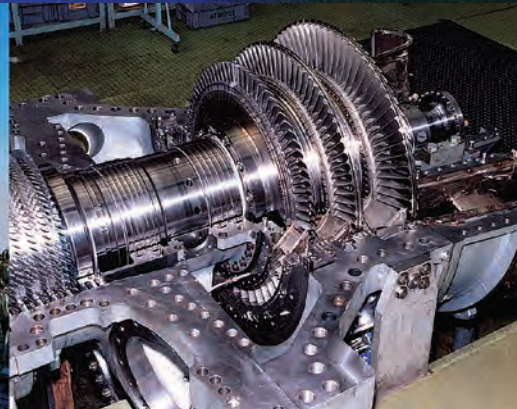
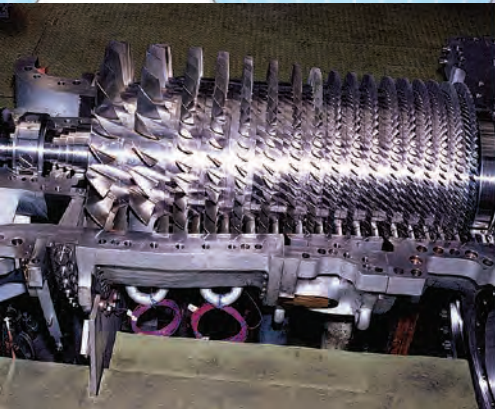


Inspection Type	Interval	Downtime
1 Combustion Inspection	16,000 (Gas) 12,000 (Oil)	7 days
2 Hot Gas Path Inspection	32,000 (Gas) 24,000 (Oil)	16 days
3 Major Inspection	64,000 (Gas) 48,000 (Oil)	25 days

Continuous Operation Case

* Interval & downtime shall be subject to operating cycle and conditions, etc.

* Cool downtime (1 days) and start-up (1~2 days) are not included in downtime.



H-25/H-15 gas turbine is manufactured by severe quality assurance and control in Hitachi Works, Hitachi City, Japan.





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