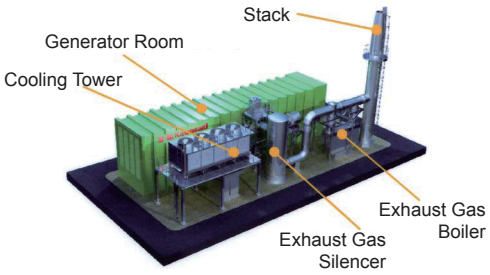
Kawasaki Heavy Industries, Ltd.

Gas Engine

Features

- 49.0% high power generation efficiency; 49.5% achieved by the high-efficiency KG-V series; 51.0% achieved by the KG-T series to further enhance economic efficiency.
- The operating range is extensive, spanning from load of 30% to 100%.
- Low NOx emission 200ppm or less (at 0% O_2) for high environmental performance.
- Electric spark ignition system is applied and no liquid fuel is required.
- Wide power range covering 5 to 7.8MW.
- Developed by Kawasaki's own technology to meet customer demands flexibility.
- Lightweight for easy transportation and installation.

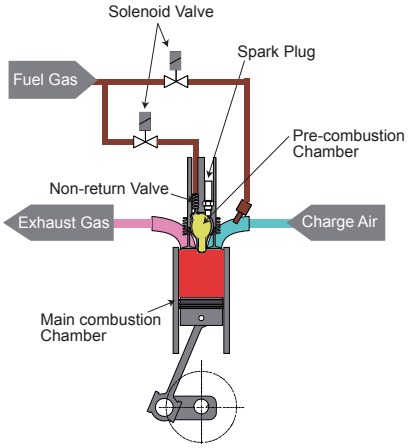
Green Gas Engine



Typical Power Station

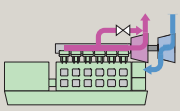
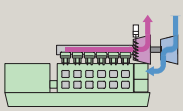
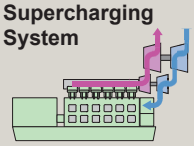
Basic Concept or Summa

- Spark plug is applied for ignition system.
- Gas supply to main and pre-combustion chambers is independently controlled by solenoid valves to achieve optimum gas injection.
- Anti-knocking performance is improved by optimizing combustion chambers.
- Individual cylinder control is applied to obtain the maximum performance.
- Variable nozzle system (see the figure below) applied to air supply control in the KG-V series instead of the conventional bypass system to allow high efficiency by making effective use of exhaust energy.
- Cogeneration system by utilizing waste heat saves energy significantly.



Gas Supply System

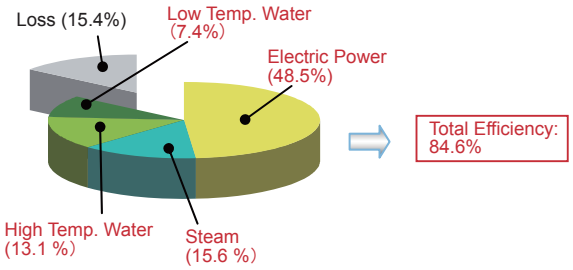
◆ Lineup

Type		KG-12	KG-18	KG-18-V	KG-18-T
Cylinder Diameter (mm)		300		300	300
Rotation Speed (min-1)	50Hz	750		750	750
	60Hz	720		720	720
Power Generation Output (kW)	50Hz	5,200	7,800	7,800	7,800
	60Hz	5,000	7,500	7,500	7,500
Power Generation Efficiency (%)		49		49.5	51
NOx(ppm) [O2=0% equivalent]		200		200	200
Possible Driving Area*		30-100%		30-100%	30-100%
Supercharging System		Bypass System 		Variable Nozzle System 	2-stage Supercharging System 

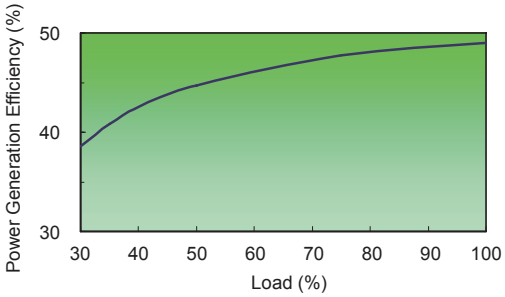
*Standard specifications 50--100%, Options 30-100% (Can be operated for up to 95 hours for the range of 30-35%)

Effects or Remarks

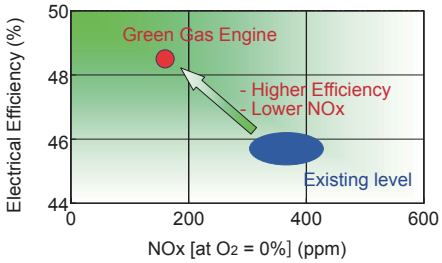
- Total efficiency of 84.6%
  by utilizing waste heat (KG series)



- High partial load efficiency
- Wide operating range



- World highest electrical efficiency (49.0%) :
  CO_2 reduced by approx. 5%
  Additional 1% reduction in the KG-V series
- Low NOx, 200ppm or less (at O_2=0%):
  NOx reduced vastly



Installation in Practice or Schedule

Domestic

- Power plant No. 1 (KG-18/7.8MW) is installed at Joetsu City, Niigata Prefecture, and has been operated since December 2007.
- Power plant No. 2 (KG-12-V/5.0MW) is installed at KHI Kobe works in Kobe City, and has been operated since January 2010.
- 14 units of KG-18 (109.2MW) were delivered to the Sodegaura Green Power Plant of Nihon Techno Co., Ltd., in August 2012.
- Orders for approximately 200 units received (as of the end of March 2023).

Panoramic view of Nihon Techno.

Inside electric generator room at Nihon Techno

Overseas

- Orders have been received for 3 units of the KG-18V for the Berkprai power plant in Thailand in 2017, which started commercial operation in 2019.
- An order has been received for 1 unit of the KG-18V for a private project in Taiwan in 2018.
- Orders have been received for 2 units of the KG-12 and 1 unit of the KG-18 for private projects in Malaysia in 2018 and 2019.

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