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ISO 9001 / ISO14001 Certified
The Gas Turbine Division is located at Akashi Works in Japan. It designs and manufactures the Gas Turbine Co-generation System, and is certified for ISO 9001, the international standard of quality assurance, and ISO 14001, the international standard for environmental management.
KAWASAKI HEAVY INDUSTRIES, LTD.
An Integrated Engineering Manufacturer Spreading its Interests by Land, Sea and Air.

Kawasaki Heavy Industries, established in 1878, has a history of more than 130 years of manufacturing integrated engineered products.

Our business has expanded to include the manufacturing of ships, railway rolling stock, aircraft, gas turbines, many types of industrial plants, steel structures, general machinery, and motorcycles. Our products are found on the land, in the sea and in the air.

By constant attention to production efficiency and through exclusive technologies developed internally, we are continuing to develop additional technologies related to transportation innovations, national land and marine resources development, space exploration development, environmental controls, new energy development, and biotechnology development.

The range of our technologies is greatly expanding to encompass large, diverse projects.
Kawasaki Gas Turbine places importance on “Efficient Energy Use”, “Eco-friendly” and “Reliable Product Care for Total Life Cycle” as a philosophy of our products. To enhance this philosophy, we have introduced a title for our products....…”GREEN Gas Turbines”.

"Get Reliable Eco-friendly Energy Now"

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History and Order Record of Kawasaki Gas Turbines

History
1943 Completed the first Gas Turbine engine for aircrafts in Japan
1952 Started overhauling jet engines
1972 Started development of Industrial Gas Turbine
1974 Completed first S1A-01 type : 200kW Gas Turbine
1977 First Kawasaki Gas Turbine genset : 200kW delivered
1979 First genset to overseas customer delivered
1984 First Kawasaki Gas Turbine Co-generation system 2x1.0 MW delivered
1985 Accumulated sales of 1,000 engines
1988 1.5 MW M1A-13 type Gas Turbine introduced
1993 5.5MW M7A-01 type Gas Turbine introduced
1995 1.5MW M1A-13D Dry Low NOx type Gas Turbine introduced
1998 Overseas sales and service affiliates were established in the U.S., Germany and Malaysia
1999 6.5MW M7A-02 type Gas Turbine introduced
5.5MW M7A-01D Dry Low NOx type Gas Turbine introduced
Accumulated delivery of 5,000th engine
Experimental ceramic Gas Turbine completed and achieved the world record of 42.1% simple cycle efficiency for the 300kW class
2000 18MW L20A type Gas Turbine introduced
2001 Akashi Works NO.4 Power Plant GPC180D : 17.6 MW commercial start-up
2005 Start-up Akashi Works Energy Center, which comprises 24.7 MW Combined Cycle and 7.8 MW Flexible Heat and Power Gas Turbine Power Plant
2006 7.7MW class M7A-03 type Gas Turbine introduced
2007 Received the 100th Order of the M7A Series
2009 15ppm (NOx) M7A-03D type Gas Turbine introduced
2010 Accumulated sales of 10,000 engines
1.7MW class M1A-17 type Gas Turbine introduced
2011 9ppm (NOx) M7A-03D type Gas Turbine introduced
2012 30MW L30A type Gas Turbine introduced
2014 30MW L30A Low-NOx hydrogen combustion type Gas Turbine launched

● Accumulated Number of Engine sales all over the world
Baseload Model

The Kawasaki GPB Series is designed for baseload applications, for both parallel operation with the grid and island mode operation. In addition, the Kawasaki GPB Series are able to operate in Co-generation service, with automatic operation capability supplying both electricity and heat (steam, hot water, direct heat) by collecting waste heat with a heat recovery steam generator (HRSG), heat exchanger, or dryer, and in Combined Cycle with a steam turbine generator. With high total thermal efficiency, the Kawasaki GPB Series are capable of highly efficient operation.

1. Self-developed Gas Turbine Fully Made in Japan
   - Various lineup and reliable installation records all over the world.
2. Very High Durability Industrial Gas Turbine
   - Removable Combustor and Inspection holes on Turbine make the inspection easier.
3. Eco-friendly
   - Kawasaki Gas Turbine has DLE (Dry Low Emission) Combustor. DLE Combustor reduces NOx significantly and cleans exhaust gas.
4. Various Type of Fuel Applicable
   - Whichever fuel, city gas, LNG, Kerosene, light oil, A-type heavy oil, off gas can be selected.
5. Reliable After Service
   - Reliable after service system is available, which satisfies customer’s requirement with spare engines and parts supply system supported by well experienced service persons.

Basic Specifications

<table>
<thead>
<tr>
<th>Engine Series</th>
<th>M1A-1A</th>
<th>M1A-1D</th>
<th>M1A-27</th>
<th>M1A-77</th>
<th>M1A-T7D</th>
<th>M1T-1A</th>
<th>M1T-1D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Turbine Model</td>
<td>GPB15</td>
<td>GPB15D</td>
<td>GPB17</td>
<td>GPB17</td>
<td>GPB17D</td>
<td>GPB19</td>
<td>GPB19D</td>
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<tr>
<td>Gas Turbine Generator Model</td>
<td>GPB15</td>
<td>GPB15D</td>
<td>GPB17</td>
<td>GPB17</td>
<td>GPB17D</td>
<td>GPB19</td>
<td>GPB19D</td>
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<tr>
<td>Maximum Continuous Electric Output (kW)</td>
<td>1,400</td>
<td>1,400</td>
<td>1,700</td>
<td>1,700</td>
<td>2,930</td>
<td>2,930</td>
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<td>Heat Rate (kW/kW-hr)</td>
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<td>11,950</td>
<td>13,400</td>
<td>13,400</td>
<td>15,100</td>
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<td>Thermal Efficiency (%)</td>
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<td>Exhaust Gas Temperature (°C)</td>
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<tr>
<td>Exhaust Gas Mass Flow (kg/s)</td>
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<td>58.2</td>
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<tr>
<td>NOx (% / 15%)</td>
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<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
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<tr>
<td>Approximate Package Dimension (L x W x H, m)</td>
<td>5.3 x 1.85 x 2.35</td>
<td>6.0 x 1.85 x 2.35</td>
<td>6.0 x 2.4 x 2.8</td>
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<tr>
<td>Approximate Package Weight (ton)</td>
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<td>11.5</td>
<td>22</td>
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</tbody>
</table>

Note: Mark “D” after Gas Turbine Model stands for Dry Low Emission
Condition: ISO Rating
1. Inlet Air Temperature: 15°C
2. Atmospheric Pressure: 101.3 kPa
3. Inlet/Exhaust Pressure Losses: No Duct Loss
4. Fuel Type: Natural Gas (100% CH4)
5. LHV of Fuel: 35.9 MJ/Nm3

The Kawasaki GPB Series is designed for baseload applications, for both parallel operation with the grid and island mode operation. In addition, the Kawasaki GPB Series are able to operate in Co-generation service, with automatic operation capability supplying both electricity and heat (steam, hot water, direct heat) by collecting waste heat with a heat recovery steam generator (HRSG), heat exchanger, or dryer, and in Combined Cycle with a steam turbine generator. With high total thermal efficiency, the Kawasaki GPB Series are capable of highly efficient operation.

Gas Turbine Illustration

Features of Kawasaki Gas Turbine Baseload Model

1. Self-developed Gas Turbine Fully Made in Japan
   - Various lineup and reliable installation records all over the world.
2. Very High Durability Industrial Gas Turbine
   - Removable Combustor and Inspection holes on Turbine make the inspection easier.
3. Eco-friendly
   - Kawasaki Gas Turbine has DLE (Dry Low Emission) Combustor. DLE Combustor reduces NOx significantly and cleans exhaust gas.
4. Various Type of Fuel Applicable
   - Whichever fuel, city gas, LNG, Kerosene, light oil, A-type heavy oil, off gas can be selected.
5. Reliable After Service
   - Reliable after service system is available, which satisfies customer’s requirement with spare engines and parts supply system supported by well experienced service persons.

In June 2012, Kawasaki introduced a new gas turbine named L30A as a flagship model of its industrial gas turbine fleet. Based on Kawasaki’s well proven design technology, this machine is said to be the most efficient 30 MW class gas turbine in the world, combined with very low emission output, high reliability and availability. In addition, with its modular system design, the L30A has realized excellent on-site maintainability. The L30A is able to provide a highly flexible solution for power generation and mechanical drive applications.

L30A : The World’s Most Efficient 30 MW Gas Turbine

At Akashi Works in Japan, Kawasaki has gas turbine test facilities which contribute to the improvement and development of various gas turbine technologies.
M1A Series Gas Turbine Generator Specifications

Site Condition for Normal Operation
- Elevation above sea level: 0 m
- Intake Air Temperature: 15 °C
- Intake Air Pressure Loss: 98 kPa
- Exhaust Gas Pressure Loss: 2.45 kPa
- LHV of Natural Gas Fuel: 35.9 MJ/Nm³

Typical Steam Condition
- Steam Pressure: 8.34 MPaG
- Steam Temperature (Superheated): 177 °C
- Blowdown from HRSG: 0 %

M1A-13A Gas Turbine
- Industrial Single-Shaft
- Rotor Speed: 22,000 rpm
- Pressure Ratio: 9.4 (-13A), 9.6 (-13D)
- 2 Stage Centrifugal Compressor

M1T-13 Gas Turbine
- Twin M1A GT with Combined Gear Box
-Coupling Shaft & Cover
- Enclosed Package
  - Carbon Steel Common Base Frame
  - Outdoor Carbon Steel
  - Acoustic Envelope
  - Noise Level: 85 dB(A) at 1 m to the side of Enclosure
  - Forced Ventilation Fan with Inlet and Intake Screen
  - Maintenance Stage, Ladder, Beam (Option)

Intake Silencer & Filter
- Painted Carbon Steel (Outer Skin and Structure)
- 2 Stage Filter with Insect Screen
- Noise Level: 85 dB(A) in front of Filter

Exhaust Silencer and Stack (Option)
- Carbon Steel Common Base Frame
- Outdoor Carbon Steel, Acoustic Enclosure
- Noise Level: 85 dB(A) in front of Filter

Standard Package Configuration (Reference)

M1A-17 Series

M1A-17 Gas Turbine
- Industrial Single-Shaft
- Rotor Speed: 22,000 rpm
- Pressure Ratio: 10.5 (-17), 10.7 (-17D)
- 2 Stage Centrifugal Compressor

Lube Oil System
- Lubrication: Grease Pack
- Bearing: Ball (Roller) Bearing
- Power Factor: 90% (Option 85%, 80%)
- Standard Voltage: 6.6 kV
- Output Power: 1500 / 1800 rpm (50/60 Hz)

Starting and Turning Motor System
- Gas Turbine and Generator Control
- Gas Turbine and Generator Control
- Gas Turbine and Generator Control
- Auto Synchronizing and Auto Sharing
- Touch Panel Operation
- Industrial Ethernet

Reduction Gear Box
- Output Speed: 1500 / 1800 rpm (50/60 Hz)

M1B/17 Typical Package Outlook: m

Table and Diagrams for M1A and M1B Series

- Table: M1A Gas Turbine Series
- Diagram: Inlet Air Temperature vs. Output Power
- Diagram: Pressure Ratio vs. Efficiency

- Table: M1B Gas Turbine Series
- Diagram: Heat Rate vs. Inlet Air Temperature
- Diagram: Output Power vs. Frequency

- Table: M1A/T-13 Series
- Diagram: Engine Performance vs. Altitude

- Table: Gas Turbine Generator Specifications
- Diagram: NOx Emission vs. Load
M7A Series Gas Turbine Generator Specifications

**Site Condition for Normal Operation**
- Elevation above sea level: 0 m
- Inlet Air Temperature: 15 °C
- Inlet Air Pressure Loss: 2.45 kPa (GPB60/60D), 3.43 kPa (GPB70/70D), 3.94 kPa (GPB80/80D)

**LHV of Natural Gas Fuel (100% CH₄)**
- GPB60/60D: 33.5 MJ/Nm³

**Typical Steam Condition**
- Steam Pressure: 3.5 MPa
- Steam Temperature (Saturated): 177 °C
- Feed Water Temperature: 80 °C
- Blowdown from HRSG: 0 %

<table>
<thead>
<tr>
<th>M7A Series Gas Turbine Series</th>
<th>GPB60</th>
<th>GPB70</th>
<th>GPB80</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas Turbine Model</strong></td>
<td>M7A-01D</td>
<td>M7A-02D</td>
<td>M7A-03D</td>
</tr>
<tr>
<td>Partial Load @ 15 °C (%)</td>
<td>100</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Electric Output (kW)</td>
<td>5,400</td>
<td>4,050</td>
<td>2,700</td>
</tr>
<tr>
<td>Fuel Rate (m³/hr)</td>
<td>12,340</td>
<td>13,460</td>
<td>15,910</td>
</tr>
<tr>
<td>Exhaust Gas Temperature</td>
<td>748</td>
<td>475</td>
<td>440</td>
</tr>
<tr>
<td>Exhaust Gas Mass Flow (kg/h)</td>
<td>77.6</td>
<td>77.3</td>
<td>77.1</td>
</tr>
<tr>
<td>Exhaust Gas Mass Flow (sl/h)</td>
<td>14.0</td>
<td>11.6</td>
<td>8.7</td>
</tr>
<tr>
<td>Overall Thermal Efficiency (%)</td>
<td>82.6</td>
<td>78.5</td>
<td>72.0</td>
</tr>
<tr>
<td>Internal Air Temperature</td>
<td>6.94</td>
<td>5.94</td>
<td>4.94</td>
</tr>
<tr>
<td>Exhaust Gas Temperature</td>
<td>539</td>
<td>548</td>
<td>583</td>
</tr>
<tr>
<td>Exhaust Gas Mass Flow (sl/h)</td>
<td>81.3</td>
<td>77.6</td>
<td>64.8</td>
</tr>
<tr>
<td>Exhaust Gas Mass Flow (kg/h)</td>
<td>14.6</td>
<td>14.5</td>
<td>19.6</td>
</tr>
<tr>
<td>Overall Thermal Efficiency (%)</td>
<td>80.0</td>
<td>78.7</td>
<td>87.6</td>
</tr>
</tbody>
</table>

**M7A-03D**

GPB60 / 70 / 80 Typical Layout:
- 4 Stage Axial Turbine

**GPB60 / 70 / 80 Typical Package Layout:**
- m

**The Leading Edge – Single Digit Super Low NOx emission Available!**

In 2011, Kawasaki introduced to the market the newest combustion system which realized Single Digit Super Low NOx emission with the M7A-03 gas turbine engine. In many countries and regions, environmental protection requirements and regulations are getting tighter and tighter. In order to meet such requirements and regulations, Kawasaki has developed its new Single Digit Super Low NOx combustion system. Furthermore, Kawasaki will apply this technology subsequently to other engines of its fleet to give the market greater satisfaction and contribute to environmental burden reduction.
### L20A Series Gas Turbine Generator Specifications

**Site Condition for Normal Perfor**
- **Elevation above sea level:** 0 m
- **Intake Air Temperature:** 15 °C
- **Intake Air Pressure Loss:** 0.98 kPa
- **Exhaust Gas Pressure Loss:** 3.43 kPa (GPB300/300D)
- **Level of Natural Gas Fuel:** 35.9 MJ/Nm³
- **Typical Steam Condition**
  - **Steam Pressure:** 80 °C
  - **Steam Temperature (Saturated):** 177 °C

#### L20A Gas Turbine
- **Turbine**
  - **Power Turbine:** 3 Stage Axial Turbine
  - **Gas Generator Turbine:** 2 Stage Axial Turbine
  - **Applicable Fuel:** Natural Gas
  - **Dry Low Emission (DLE) (GPB180D)**
  - **Conventional Diffusion (GPB180)**
- **Combustor**
  - **Dual Ignition System**
  - **8 Can Combustors**
  - **IGV & 4 Stage VSV**
- **Compressor**
  - **14 Stage Axial Flow**
  - **IGV & 4 Stage VSV**

#### L20A Standard Package Configuration
- **Starting and Turning System**
  - **Various Frequency Drive (VFD)**
- **Lube Oil System**
  - **Lube Oil: Turbine Oil ISO VG32 (optional VG46)**
  - **Turbine Driven Main Lube Oil Pump**
  - **Pre-Post Lube Oil Pump**
  - **Emergency Lube Oil Pump**
  - **Water Cool Oil Cooler with Temp Control Valve**
  - **Oil Reservoir integrated with Baseplate:** 5,900 liter
  - **Stainless Steel Piping:** Down Stream of Filter
- **Exciter:**
  - **Brushless PMG**
- **Generator**
  - **Microprocessor Based Programmable Logic Controller (PLC)**
  - **CPU: Power Module:** Option Redundant
- **Cooling System**
  - **Water Cooler Oil Cooler with Temp Control Valve**
  - **Oil Reservoir integrated with Baseplate:** 11,700 liter
  - **Stainless Steel Piping:** Down Stream of Filter
  - **Duplex Full-flow Filter**
  - **Oil Vapor Fan**

#### L20A Gas Turbine Series
- **Gas Turbine Model**
  - **GPB180/180D**

#### L30A Series Gas Turbine Generator Specifications

**Site Condition for Normal Perfor**
- **Elevation above sea level:** 0 m
- **Intake Air Temperature:** 15 °C
- **Intake Air Pressure Loss:** 0.98 kPa
- **Exhaust Gas Pressure Loss:** 3.43 kPa (GPB300/300D)
- **Level of Natural Gas Fuel:** 35.9 MJ/Nm³

#### L30A Gas Turbine
- **Turbine**
  - **Power Turbine:** 3 Stage Axial Turbine
  - **Gas Generator Turbine:** 2 Stage Axial Turbine
  - **Applicable Fuel:** Natural Gas
  - **Dry Low Emission (DLE) (GPB300D)**
  - **Conventional Diffusion (GPB300)**
- **Combustor**
  - **8 Can Combustors**
  - **Dual Ignition System**
  - **IGV & 4 Stage VSV**
- **Compressor**
  - **14 Stage Axial Flow**
  - **IGV & 4 Stage VSV**

#### L30A Standard Package Configuration
- **Starting and Turning System**
  - **Various Frequency Drive (VFD)**
- **Lube Oil System**
  - **Lube Oil: Turbine Oil ISO VG32 (optional VG46)**
  - **Turbine Driven Main Lube Oil Pump**
  - **Pre-Post Lube Oil Pump**
  - **Emergency Lube Oil Pump**
  - **Water Cool Oil Cooler with Temp Control Valve**
  - **Oil Reservoir integrated with Baseplate:** 11,700 liter
  - **Stainless Steel Piping:** Down Stream of Filter
- **Exciter:**
  - **Brushless PMG**
- **Generator**
  - **Microprocessor Based Programmable Logic Controller (PLC)**
  - **CPU: Power Module:** Option Redundant
- **Cooling System**
  - **Water Cooler Oil Cooler with Temp Control Valve**
  - **Oil Reservoir integrated with Baseplate:** 11,700 liter
  - **Stainless Steel Piping:** Down Stream of Filter
  - **Duplex Full-flow Filter**
  - **Oil Vapor Fan**

#### L30A Gas Turbine Series
- **Gas Turbine Model**
  - **GPB300/300D**

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**L20A Typical Package Outlook:** m

**L30A Typical Package Outlook:** m
Standby Model Introduction

Excellent Features of Kawasaki Standby Gas Turbine Generators Sets

Kawasaki has installed over 7,000 Standby Gas Turbine Generator Sets rated from 200 kVA to 6,000 kVA worldwide. The reliability of Kawasaki Standby Gas Turbine Generator Sets has allowed to install in Internet Data Centers, Hospitals, and Key Facilities where uninterrupted power is certainly required.

- High Performance, and very reliable, with the low cost gas turbine solution
- Easy Maintenance
- Dual Fuel Capability
- Low Noise Operation
- Low Vibration
- No Cooling Water
- High Starting Reliability, and quick start
- Light Weight, and space saving, easy transportation and installation
- Excellent frequency control, even with large step loads

Example of GPS2000 System Configuration for Indoor Installation

Typical Standby / Gas Turbine Generator Layout

Basic Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>GP2750</th>
<th>GP3150</th>
<th>GP3150</th>
<th>GP3280</th>
<th>GP32800</th>
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<tbody>
<tr>
<td>Nominal Output</td>
<td>600</td>
<td>1,000</td>
<td>1,200</td>
<td>1,600</td>
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<td>Load Rejection Capacity</td>
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<td>1.7</td>
<td>1.7</td>
<td>1.8</td>
<td>1.9</td>
<td>2.0</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Height (m)</td>
<td>2.1</td>
<td>2.6</td>
<td>2.8</td>
<td>2.9</td>
<td>3.0</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>6.0</td>
<td>10.5</td>
<td>11.4</td>
<td>14.7</td>
<td>19.7</td>
<td>20.8</td>
<td>24.6</td>
</tr>
<tr>
<td>Noise Level</td>
<td>Approx. 80 dBA</td>
<td>Approx. 80 dBA</td>
<td>Approx. 80 dBA</td>
<td>Approx. 80 dBA</td>
<td>Approx. 80 dBA</td>
<td>Approx. 80 dBA</td>
<td>Approx. 80 dBA</td>
</tr>
</tbody>
</table>

Note:
1. Output: Up to 40°C of ambient temp., 150 m above sea level.
2. Fuel Consumption: At full load, 15°C, using diesel fuel, allowance is 5%.
3. Other voltage is available as option.

Typical Timing Chart Of Operation
Kawasaki MGP/TGP Series are gas turbine generators mounted on trucks or trailers for mobile application. MGP/TGP integrate all necessary equipment and enable fully automatic operation without the need for external power supply. High durability against vibration and shock, and reliable operation are important for this application. Kawasaki MGP/TGP is designed to fully meet such demands.

**Advantages**

1. **Developed with Vast Field Experience**
   Gas Turbines on trucks or trailers need to withstand large vibration/shock when the trucks run on roads. Kawasaki meets mobile installation condition with gas turbines experience and technology from Kawasaki aircraft jet engines operating under similar severe environmental conditions.

2. **Low Center of Gravity and Large Tumble-down Angle**
   Thanks to light weight of gas turbines, the center of gravity of MGP/TGP is low, and this makes it possible to have stable maneuverability.

3. **Compact Integration**
   MGP/TGP incorporate all necessary equipment, including fuel tank, batteries, exhaust silencer, cable reel, etc., inside a compact aluminum enclosure. This feature enables easy maintenance.

4. **Blackout Start Capability**
   MGP/TGP can start up and supply electricity without any external utility supply, such as electric power and fuel.

---

**Basic Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>MGP 750</th>
<th>MGP 1250</th>
<th>MGP 2500</th>
<th>MGP 5000</th>
<th>TGP 1000</th>
<th>TGP 1500</th>
<th>TGP 2000</th>
<th>TGP 2500</th>
<th>TGP 3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>Kerosene, Diesel</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Load Application Allowance</td>
<td>100% (Resistance Load)</td>
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</tr>
<tr>
<td>Freq. (Deviation, Transient)</td>
<td>Within ±0.3%</td>
<td></td>
<td></td>
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<td>Fuel Consumption</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Truck / Trailer Type</td>
<td>Truck</td>
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</tr>
<tr>
<td>Truck / Trailer Dimensions</td>
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</tr>
<tr>
<td>Max. Length (m)</td>
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<tr>
<td>Fuel Tank</td>
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</tr>
<tr>
<td>Max. Width (m)</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total Weight (t)</td>
<td>9,6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Installation Example**

- **TGP3000**
- **MGP1250**
- **MGP2000**
Kawasaki Techno-Net

- **Full Time Support**
- **Maintenance Management**
  - Predictive services based on trending data and asset maintenance management
    - **What to do**  **When to do it**  **How to do it**  **Who’s to do it**
- **Improvement of Availability and Quality of Maintenance**
  - Minimum down time and good quality with adequate maintenance strategies and execution.
- **Remote Maintenance System by a GT Expert**
  - Proven effectiveness by most Kawasaki remote maintenance users
  - Fleet wide analysis

Techno-Net system continuously monitors the Gas Turbine Plant in any region of the world

**Three main features of Techno-Net system**

- **Global remote monitoring**
  - Remote monitoring through the internet
- **Preventing serious failures**
  - Enforced monitoring and diagnosis
- **Maintenance management**
  - Adequate management of maintenance

Connection of centers through the internet

Communications through the telephone net / internet between customer and the centers

- **Internet / Intranet**
  - The Kawasaki World Business Center in the USA, Germany, Malaysia, China, Korea and Japan are connected by the Internet and by the KHI intranet to monitor gas turbines remotely and globally.

- **Attended monitoring**
  - All system data is monitored and recorded hourly, as well as all start signals and first out malfunction signals.
  - Predictive and preventative maintenance is accomplished by analysis of thermal cycles and unit vibration.

**Installation Examples**

Kawasaki Gas Turbine has been installed to:

- Data Center
- Paper Mill
- Hospital
- Food Process
- College Campus
- Oil & Gas
- Tire Manufacturer
- District Heat & Cooling
- AND MORE !!!

In 2010 Kawasaki accumulated 10,000th Kawasaki Gas Turbine Engines in all over the world !!!

- **M1 Series**
  - GP815D USA
  - GP830 VENEZUELA
  - GP4000 USA
- **M7 Series**
  - GP870D PAKISTAN
  - GP870 JAPAN
  - GP850 GERMANY
- **L20 / L30 Series**
  - GP8140 PORTUGAL
  - GP8154X3 IRAN
  - GP8140 JAPAN
  - GP8130 JAPAN