GAS POWERED
MICRO COGENERATION
Cogeneration systems offer higher overall efficiency than typical remote electrical power generation by utilizing the heat energy that is usually lost during the conversion of primary energy into electrical power. A Yanmar micro cogeneration unit generates electrical power using a gas engine with heat reclamation. Since micro cogeneration units can be installed near to the buildings that are using power from the units, it is easy to utilize the reclaimed heat from the unit. This makes a great contribution to saving energy, reducing power transmission losses, cost reduction and reduced environmental impact (lower CO2 emissions).

Benefits of micro cogeneration

Power generation using gaseous fuel, such as natural gas, has a lower impact on the environment compared to many other commonly used fuels. This benefit is further enhanced by the use of a cogeneration system such as the Yanmar micro cogeneration unit.

Comparison of CO2, NOx, SOx emissions
Proportion of substances produced in fossil fuel combustion (coal=100)

<table>
<thead>
<tr>
<th></th>
<th>Coal 100</th>
<th>Oil 80</th>
<th>Natural gas 60</th>
<th>Coal 100</th>
<th>Oil 70</th>
<th>Natural gas 20-40</th>
<th>Coal 100</th>
<th>Oil 70</th>
<th>Natural gas 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2</td>
<td>100</td>
<td>80</td>
<td>60</td>
<td>100</td>
<td>70</td>
<td>20-40</td>
<td>100</td>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td>NOx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Natural gas is kinder to the environment than other fossil fuels, since the amount of CO2, NOx and SOx etc. generated emissions are comparatively small.

Source: Natural Gas Prospects 2010, 1984/IEA

CP Features

- High efficiency Yanmar design
  - Lower total energy costs
  - Helps reduce CO2 emissions

- Promotes on-site gas consumption
  - Reduces reliance on electrical power system
  - Natural gas, propane and biogas models (25kW type)

- Flexible installation
  - Indoor or outdoor installation
  - Low operation noise

- Flexible operation
  - Heat or power based with integral radiator
  - Multiple unit operation

- Reliable operation
  - 10,000 hour maintenance interval
  - Over 6,000 installations globally
System Configuration

Cogeneration package

Typical loads

System Controller

Setting functions
- Scheduled operation
- Manual operation
- Holiday setting
- Operation start power, operation stop power
- Multiple unit operation (number of units, location, group operation)

Monitor functions
- Setting value, setting value confirmation
- Running data (generated power, incoming power, voltage, current etc.)
- Alarm displays (history, alarm condition, reset condition)

Alarm setting functions
* Only for resetable alarms
(please refer to the operation manual for details)

Emergency stop functions

Outline Drawing of Gas Cogeneration Main Unit

(Unit: mm)

Options

<table>
<thead>
<tr>
<th>Items</th>
<th>Type</th>
<th>Items</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater kit (for ambient temperature -4°C to -15°C)</td>
<td>HHG4W</td>
<td>Exhaust pipes selection joint</td>
<td>EHC4W</td>
</tr>
<tr>
<td>Anti vibration mount</td>
<td>BRG55</td>
<td>Flexible exhaust pipes</td>
<td>JRG4W</td>
</tr>
<tr>
<td>System controller</td>
<td>LKD-605/H/K</td>
<td>Drain system (short type long type)</td>
<td>SWF9R, SWF1L</td>
</tr>
<tr>
<td>Wall mount box for system controller</td>
<td>NKC160C</td>
<td>Neutralizer (drain line)</td>
<td>DF916E</td>
</tr>
<tr>
<td>Remote monitoring adapter (wall mount type)</td>
<td>CL.CG18/1</td>
<td>Radiator exhaust air direction change duct</td>
<td>FXG5R</td>
</tr>
<tr>
<td>Transducer kit (for non inverse power operation)</td>
<td>TRG4W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Typical Applications

Standard specification

- Manufacturing facilities
- Exhibition centres
  - Meeting halls
  - Wedding halls
- Hospitals
  - Care facilities
- Hotels
  - Hostels
- Restaurants
  - Cafes
- Office buildings
- Supermarkets
  - Department stores
  - Shopping malls
- Sports centres
  - Leisure centres
  - Schools / Universities

* Specifications may change in order to incorporate continuous improvement
* Product images may differ slightly from actual products
* Every effort has been made to ensure specifications are correct, please consult the technical manual for confirmation
* Before using this equipment read the operation manuals and use correctly
* The various usage conditions (temperature, voltage, humidity etc), usage purposes (run time, applications etc), functions, terminology and expressions given in this brochure are based on Yanmar Energy System Co., Ltd standards.