An Introduction of MCHP Unit for Residential Use

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Fig. 2  External view of Honda Micro CHP
Development Concept

1: Utilizing the primary energy with minimal waste.
   • High energy utilization efficiency
   • Reduce discharge of CO\(^2\) and NOx

2: Installation to general residence.
   • Compact package
   • Low operation noise
   • High quality power supply
   • Connection with hot water supply and heating system
Energy Utilization Ratio (conventional style)

Energy service system by thermal power station
(Average of 9 Japan electricity service companies in 1998)

Fig. 4  Comparison of total energy efficiency
Energy Utilized Ratio (MCHP model)

◆ Energy supply by using MCHP

(by natural gas)

N. Gas

Supply through gas pipe line

Honda MCHP1.0 unit

Electricity Grid

Elec., Heat

Primary energy
(City gas)

100

20

65

15

Electricity Energy

Thermal Energy

Waste heat energy

Energy utilization ratio
85 % LHV

Fig. 4  Comparison of total energy efficiency

※ Calculation result with MCHP unit
Fig. 5  Generator (27 poles)

Fig. 6  Heat Exchanger with built-in catalyzer
## Honda MCHP1.0 Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fuel</strong></td>
<td>Natural Gas (Japan 13A)</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>1Φ 200V/100V 50/60Hz 1 kW</td>
</tr>
<tr>
<td>Heat</td>
<td>3.25 kW</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>Grid interconnection</td>
</tr>
<tr>
<td><strong>Heat recovery</strong></td>
<td>Max. 80°C Hot coolant</td>
</tr>
<tr>
<td><strong>Efficiencies</strong> (LHV)</td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td>20%</td>
</tr>
<tr>
<td>Heat</td>
<td>65%</td>
</tr>
<tr>
<td><strong>Dimension</strong> (L x W x H)</td>
<td>640x380x940 mm</td>
</tr>
<tr>
<td><strong>Operation Weight</strong></td>
<td>82 (kg)</td>
</tr>
<tr>
<td><strong>Operation Noise</strong></td>
<td>44 (dB(A) / 1 m)</td>
</tr>
<tr>
<td><strong>Emission (NOx)</strong></td>
<td>Max. 60ppm</td>
</tr>
<tr>
<td><strong>Engine</strong></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Liquid cooled 4-stroke OHC</td>
</tr>
<tr>
<td>Displacement</td>
<td>vertical single cylinder</td>
</tr>
<tr>
<td><strong>Starting system</strong></td>
<td>Starter Generator</td>
</tr>
</tbody>
</table>

Table 1 Specifications
Internal Structure of Honda MCHP1.0

Fig. 3 internal structure

- **Exhaust Top**
- **Ventilation outlet**
- **ENG air intake**
- **Large Air filter box**
- **Exhaust muffler**
- **Cylinder Head**
- **NG Inlet**
- **Condensing water outlet**
- **Long Life Coolant out/in**
- **Heat Exch. with CAT**

**Electrical Parts**
- Interconnection Inv.
- Electric Control Unit
- Starter/generator Driver
- Power supply unit

**Intake air Silencer**

**Multipole Generator**

**Single Cyl. Gas ENG**

**Oil Filter**

**Large oil Reservoir**

**Triple construction**

**Rubber ENG Mount**
Honda MCHP1.0  Comparison of layout

Conventional Generator

- Cylinder Head
- alternator
- Fly Wheel

New multi-pole Gen.

- Cylinder Head
- Multipole alternator

「MCHP unit Generator」

- Multi-pole alternator
- Cylinder Head
- Vertical crankshaft layout engine
- Big Engine oil tank

Fig. 7  comparison of layout
Honda MCHP1.0 Achievement Technique

- Installation in a typical house (compact package)
- Reduction of operation noise

Measurement distance

Operation noise level

Depth [mm]

Width [mm]

Air condoutside unit

Fuel oil tank

MCHP

For residential

For Business

Boiler

Portable generator

Industrial level

Portable level

Residential level

Measurement distance [m]

[dB(A)]
Current Business Model in Japan

In Japan Gas Company has Distribution Channel and Service Division

- **MCHP Unit Maker** like Honda
- **Boiler and Tank Maker**

Gas Company

- **House Makers Installers**

End Users

General domestic use view of MCHP system
• Beta Testing in Japan
  20 sites test completed
  80 sites test ongoing – complete fall 2003

• Production/ Sales Started March 2003
  Aproximate Retail cost *$6400
  * Final price set by Gas Company depending on each installation

• 1000 unit 1st year sales goal
  ( initial sales ahead of plan)

• Conducting feasibility study for USA market
The End

Thank You