NANIWA
CARGO PUMP & CARGO PUMP TURBINE
The C series of heavy-duty cargo pumps have been developed for high performance and long life. Naniwa Pump has been manufacturing such pumps in series for more than 30 years, many of which are in use in a large number of tankers, giving excellent services.

**FEATURES**

- The centrifugal, axially split casing has a hydrodynamically well-balanced shape and excellent pumping efficiency and suction performance.
- Compactness and light weight simplify pump room arrangement.
- A relatively short shaft combines with a well-balanced integrated rotor unit to ensure low vibration. Corrosion is prevented since no part of the shaft comes into direct contact with the cargo oil.
- The standard Ni-Al-Bronze casing and impeller material has a tensile strength 2.4 times higher, 2.3 times harder and 4.8 times stronger in anti-corrosion properties than ordinary bronze.
- A lubricating fluid system for mechanical seals protects the pump from accidental dry operation and maintains the optimum condition in any mode of operation. An oil pot is provided for filling of lubricating oil as well as for inspection of the mechanical seals.
- Heavy-duty ball bearings are used due to heavy radial and thrust load of the impeller. Fans cool the bearings and the mechanical seal lubricating oil for safe operation over a long period.
- The axially split casing allows overhaul without removing the intermediate shaft or piping. Replacement of the mechanical seals and bearings without removing the casing cover will result in quick and easy maintenance.
- The pumps are normally delivered with high efficiency and high performing Naniwa-Mitsubishi steam turbines.

**CV/CH**

**REMARKS**

In selecting the suitable size pump from the performance chart, if the specified H-Q point is positioned just on the boundary line, please select the type of pump with a lower reading. The outputs stated in the following table are the max. shaft power of each H-Q point.
Naniwa-Mitsubishi steam Turbine series EN, ENV, ERV & CNV

CARGO PUMP TURBINE

Standard model (ENV-EN-CNVi) ......................................................

ENV- 12 G

<table>
<thead>
<tr>
<th>Type</th>
<th>Classification by rotor dia.</th>
<th>1: Single stage</th>
<th>3: 3 stages</th>
<th>Geared</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN</td>
<td>Horizontal model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN</td>
<td>Vertical type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNV</td>
<td>Vertical type</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard model (ERV) .................................................................

ERV- 3 2

<table>
<thead>
<tr>
<th>Type</th>
<th>Classification by rotor base dia.</th>
<th>3: 300 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN</td>
<td>Mid-stage model</td>
<td></td>
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</table>

FEATURES (ENV, EN & ERV)

- High efficiency
- Excellent performance
- Simple construction and easy maintenance
- Compact light weight design
- Dual electric overspeed trip
- Separate trip & throttle valve and governing valve

FEATURES (CNV)

- Compared with single stage type, steam consumption is reduced by about 20% through adoption of high performance nozzle and blade.
- Running fee (fuel fee) can be paid within 5 years.
- Due to reduction of steam consumption, mini-mization of boiler capacities can be realized.
- Safety device with independent trip values achieves high reliability.
- Nozzle and blade materials are highly resistant to erosion and thereby enable longer life.
- Simple construction facilitates easy maintenance.
- Dual electric overspeed trip.
- Separate trip & throttle valve and governing valve.

Principal Particulars

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>ENV-112GN</th>
<th>ENV-116GN</th>
<th>ENV-120GN</th>
<th>ENV-125GN</th>
<th>ERV-32N</th>
<th>CNV-320GN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotating direction of gear shaft</td>
<td></td>
<td>Vertical (Horizontal)</td>
<td>Curtis single stage</td>
<td></td>
<td></td>
<td>Vertical 2-plate stage</td>
<td>Vertical 3-plate stage</td>
</tr>
<tr>
<td>Max. output (kW)</td>
<td></td>
<td>600</td>
<td>1,200</td>
<td>4,000</td>
<td>5,000</td>
<td>1,300</td>
<td>2,000</td>
</tr>
<tr>
<td>Max. turbine speed (rpm)</td>
<td></td>
<td>12,000</td>
<td>12,500</td>
<td>11,000</td>
<td>9,500</td>
<td>11,000</td>
<td>8,500</td>
</tr>
<tr>
<td>Gear size (in mm)</td>
<td></td>
<td>38×15</td>
<td>46×20</td>
<td>53×25</td>
<td>60×29</td>
<td>67×36</td>
<td>60×29</td>
</tr>
<tr>
<td>Max. gear shaft speed (rpm)</td>
<td></td>
<td>3,500</td>
<td>2,500</td>
<td>2,000</td>
<td>1,850</td>
<td>1,550</td>
<td>1,850</td>
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<tr>
<td>Max. inlet pressure (kg/cm²G)</td>
<td></td>
<td>22</td>
<td>63.3</td>
<td></td>
<td></td>
<td>30</td>
<td></td>
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<tr>
<td>Max. inlet temperature (°C)</td>
<td></td>
<td>350</td>
<td>425 (523.8 for SCPH21, ANSI 900#)</td>
<td>425</td>
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<tr>
<td>Max. exhaust pressure (kg/cm²G)</td>
<td></td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Steam inlet bore (mm)</td>
<td></td>
<td>JIS 20K-65#/#80#</td>
<td>JIS 20K-150#</td>
<td>JIS 20K-150#</td>
<td>JIS 20K-150#</td>
<td>JIS 20K-125#</td>
<td>JIS 20K-125#/150#</td>
</tr>
<tr>
<td>Steam exhaust bore (mm)</td>
<td></td>
<td>JIS 5K-250#</td>
<td>JIS 5K-300#</td>
<td>JIS 5K-400#</td>
<td>JIS 5K-500#</td>
<td>JIS 5K-500#</td>
<td>JIS 5K-500#</td>
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<tr>
<td>Speed governor</td>
<td></td>
<td>Woodward PSG</td>
<td>Woodward PSG</td>
<td>Woodward PSG</td>
<td>Woodward PSG</td>
<td>Woodward PSG</td>
<td>Woodward PSG</td>
</tr>
<tr>
<td>Lubrication system</td>
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<td>Forced lubrication (turbine oil #140-200)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Cooling water required (m³/h)</td>
<td></td>
<td>8m³/h × Max. 32°C</td>
<td>16m³/h × Max. 32°C</td>
<td>25m³/h × Max. 32°C</td>
<td>8m³/h × Max. 32°C</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td></td>
<td>1,400</td>
<td>2,900</td>
<td>4,000</td>
<td>4,900</td>
<td>5,700</td>
<td>5,100</td>
</tr>
<tr>
<td>Vertical</td>
<td></td>
<td>1,500</td>
<td>2,800</td>
<td>3,900</td>
<td>4,800</td>
<td>5,600</td>
<td>5,800</td>
</tr>
</tbody>
</table>

Specifications may change without notice.
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