NANIWA ECOLOGICAL OPERATION
NEO-ME SERIES

PATENT PENDING No.2014-005249
Introduction

Naniwa Pump supports customer expectation for “greener ships”, paying close attention to the following parameters.

Current central cooling system design runs pumps continuously at full speed. Capacity of Main Cooling Sea Water Pumps has been calculated based on 100% main engine load at 32 degree C sea water. Depending on actual vessel operating condition Main Cooling Sea Water Pump discards sea water to cooling system.

<table>
<thead>
<tr>
<th></th>
<th>Design ⇒ Actual</th>
<th>Required Pump Capacity</th>
<th>Required Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Water</td>
<td>32 degree C ⇒ 25 degree C</td>
<td>18.4% Down</td>
<td>45.6% Down</td>
</tr>
<tr>
<td>Main Engine Load</td>
<td>100% ⇒ 50%</td>
<td>50.0% Down</td>
<td>87.5% Down</td>
</tr>
</tbody>
</table>

*Based on 8,000teu Container carrier

Working Principle

Naniwa Pump developed NEO-ME series to operate Main Cooling Sea Water Pumps with economy and safety. Its standard features are as follows:

- High response performance to main engine load
- 0% Speed at 100% F.W. Circulation
- Optimized operation for vessel speed reduction
- Adaptive to sea water temperature change
- Automatic Flushing
- Full time minimum fuel consumption

Naniwa Pump designed NEO-ME series controlling rotational speed of Main Cooling Sea Water Pump according to following information.
Diagram for Central Cooling System with NEO-ME series

How does NEO-ME affect fuel consumption?

- **Fuel Consumption of Generator Engine**
  
  334.8 ton/year **→** 44.0 ton/year

  88% Less

- **Cash Flow**

  ![Diagram of Central Cooling System with NEO-ME series]

  **Basic Technical Data**
  
  a) Ship type: 9,000 ~ 10,000t eu Container Carrier
  
  b) Inverter Driven Main Cool. S. W. Pump:
     - 2 set x 1,500m3/h x 20m x 125kW x 1,150rpm
  
  c) Shaft Horse Power at specific QH point: 110kW
  
  d) Average Rotational Speed of the pump: 575rpm
     (50% of rated speed, Assumption)
  
  e) Shaft Horse Power at 50% of rated speed: 13.75kW
  
  f) Design Data of Aux. Engine
     - Rate of fuel consumption: 190g/kWh
     - Efficiency of generator: 94%
     - Operation time (Assumption): 7,000 hours per year
  
  g) Efficiency of Inverter: 95%
  
  h) Electric Motor
     - Rating: 125kW-6P
     - Efficiency: 93%
  
  i) Bunker Price: USD 600/ton
Monitoring Panel for NEO-ME series (12 in Touch Screen)

- **System Diagram**
- **Monitoring 1 (Present Operating Condition)**
- **Monitoring 2 (Operating Record)**
- **Performance (Pump Operating Condition)**

**Standard Table for NEO-ME series**

- **NEO Controlled Pump**

<table>
<thead>
<tr>
<th>Pump Model</th>
<th>FEWV-250</th>
<th>FEWV-300</th>
<th>FEWV-350</th>
<th>FEWV-400</th>
<th>FEWV-450</th>
<th>FEWV-500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (m³/h)</td>
<td>300~580</td>
<td>450~830</td>
<td>830~1100</td>
<td>1100~1600</td>
<td>1600~2100</td>
<td>2100~3000</td>
</tr>
<tr>
<td>Total Head (m)</td>
<td>15~25</td>
<td>15~25</td>
<td>15~25</td>
<td>15~25</td>
<td>15~25</td>
<td>15~25</td>
</tr>
<tr>
<td>Motor Output (kW)</td>
<td>30~55</td>
<td>45~90</td>
<td>55~110</td>
<td>75~150</td>
<td>100~160</td>
<td>125~280</td>
</tr>
</tbody>
</table>
### MODEL NEO-ME_P (2 pumps parallel running)

<table>
<thead>
<tr>
<th>Operating Condition</th>
<th>2 pumps parallel running</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>NEO-ME30P</td>
</tr>
<tr>
<td><strong>Motor Output (kW)</strong></td>
<td>30</td>
</tr>
<tr>
<td><strong>Dimension</strong></td>
<td>A: 4000</td>
</tr>
<tr>
<td></td>
<td>B: 2250</td>
</tr>
<tr>
<td></td>
<td>C: 1200</td>
</tr>
</tbody>
</table>

### MODEL NEO-ME_S (1 pump singular running)

<table>
<thead>
<tr>
<th>Operating Condition</th>
<th>1 pump singular running</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>NEO-ME30S</td>
</tr>
<tr>
<td><strong>Motor Output (kW)</strong></td>
<td>30</td>
</tr>
<tr>
<td><strong>Dimension</strong></td>
<td>A: 2650</td>
</tr>
<tr>
<td></td>
<td>B: 1500</td>
</tr>
<tr>
<td></td>
<td>C: 600</td>
</tr>
</tbody>
</table>

### Additional Information
- NEO CONTROL PANEL
- STARTER PANEL
- INVERTER PANEL
- MONITORING PANEL
- Dimensions: Width (A) 5500 mm, Height (B) 1600 mm, Depth (C) 500 mm