MD high pressure stage casing pump
Main industries and applications

The MD pumps are suitable for pumping clean or slightly polluted, hot or cold water. They have been specifically designed for applications such as:

- Main boiler feed in captive, independent, combined-cycle, concentrated solar, biomass and industrial power plants
- Start-up boiler feed in utility thermal power plant
- High pressure water in the general industry

![Power generation](image1)
![Oil and gas](image2)
![General industry](image3)
![Water and wastewater](image4)
Features and benefits

1 Casing support
   • Centerline mounting absorbs high forces and moments
   • Pre-warming not required

2 Impeller
   • Several hydraulic sets per pump size guarantee high efficiencies and low operating costs over a wide operating range

3 Shaft
   • Transmits the required torque and minimizes deflection

4 Rotor design
   • Stacked rotor with staggered keyways to transmit torque

5 Intermediate take-off
   • Reduces head losses; large take-off flow is available on certain sizes

6 Balance drum
   • Balance drum and axial thrust bearing designed for long life under extreme operating conditions

7 Bearings and lubrication
   • Sleeve radial and tilting pad thrust bearings are optional for high power and thrust duties
   • External lube oil supply can be provided for high power and thrust duties

8 Discharge casing and nuts
   • Mechanical tensioners allow simple tightening and loosening and provide high security against loosening (no special tooling required)
   • High pressure version available up to 350 bar MAWP (5 080 psi) and able to accept downward thermal transients
Materials

<table>
<thead>
<tr>
<th>Pump part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction, stage and discharge casings</td>
<td>Chrome steel</td>
</tr>
<tr>
<td>Impellers and diffusers</td>
<td>Chrome steel</td>
</tr>
<tr>
<td>Shaft</td>
<td>Chrome steel</td>
</tr>
<tr>
<td>Balancing system</td>
<td>Chrome steel</td>
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</tbody>
</table>

Operating data

<table>
<thead>
<tr>
<th></th>
<th>50 Hz</th>
<th>60 Hz</th>
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</thead>
<tbody>
<tr>
<td>Pump sizes</td>
<td>up to 200 mm</td>
<td>up to 8 in.</td>
</tr>
<tr>
<td>Capacities</td>
<td>up to 1'200 m³/h</td>
<td>up to 5'300 USgpm</td>
</tr>
<tr>
<td>Heads</td>
<td>up to 2'800 m</td>
<td>up to 9'200 ft.</td>
</tr>
<tr>
<td>Suction pressures</td>
<td>up to 50 bar</td>
<td>up to 725 psi</td>
</tr>
<tr>
<td>Discharge pressures</td>
<td>up to 350 bar</td>
<td>up to 5'080 psi</td>
</tr>
<tr>
<td>Temperatures</td>
<td>up to 210°C*</td>
<td>up to 410°F*</td>
</tr>
</tbody>
</table>

* Higher temperatures upon request

Performance ranges

[Graphs showing performance ranges for 50 Hz and 60 Hz]
Alternative thrust bearing arrangements

Non-Drive End (NDE) bearing arrangement with balance drum
The balance drum device carries the major proportion of the hydraulic thrust. The drum diameters are chosen to minimize the thrust at normal operating point. The residual and additional thrust loads occurring above/below the normal operating point are carried by the thrust bearing, typically a tilting pad.

The balance drum is suitable for:
- Long life under extreme operating conditions
- Frequent start-stop applications thanks to nearly wear-free device

NDE bearing arrangement with balance disc
With a balance disc, the axial force is completely compensated, therefore no axial thrust bearing is required. The disc designs are optimized for each hydraulic and size.

For operation with frequent start and stops, the installation of a lift-off device is available (either mechanical or magnetic).

Mechanical or magnetic (Permavor) lift-off devices
Advantages:
- Prevent touching and wearing of disc/counter disc operation at low speed such as start-up and shut-down
- Self-controlling passive systems
- Reduce load on balance disc under normal operation
- Offer long service life

High pressure design
- Design pressure (MAWP) up to 350 bar
- Extended flow and head range suitable to meet the requirements in the steam-water cycle of latest developments of heavy duty high output gas turbines
- Advanced design to accommodate steep thermal transient conditions (upwards and downwards)