TWINRO (“W” series) pumps from Plenty Mirrlees are positive displacement rotary twin screw pumps designed for bulk transfer of liquids.

The TWINRO series is available in five frame sizes with a selection of different pitch screwsets to match system flow requirements at 50 Hz. or 60 Hz. direct electric motor speeds. Pumps may also be driven at other speeds from diesel engines or other prime movers.

The material and design options available enable the pump to be offered for most bulk liquid transfer duties across many industries. In particular the pump is used extensively in bulk loading and unloading duties in the Oil, Marine, Power Generation and Chemical Industries.

**Applications**

- Any bulk transfer of liquid - such as:
  - Rail/road car unloading/loading
  - Tank to tank transfer
  - Tank to process transfer
    - (and process to tank transfer)
  - Ships bunkering
  - Ships liquid cargo pumping
  - Bilge and ballast pumping
  - Distribution in liquid marketing terminals
  - Pipeline and process flow requirements

**Liquids Pumped**

Pumps constructed from stock materials (iron and steel) are commonly used for:

- Lubricating oils
- Fuel oils (residual and distillate)
- Petroleum liquids
- Bitumens/Asphalts
- Solvents
- Vegetable oils
- Glues, Varnish, Resins, Paints, Polymers

Custom built pumps - typically in stainless steels or bronze are used for applications with mild corrosion effect.

- Palm oils
- Fatty acids
- Water (fresh or sea)
- Some acids
DESIGN AND CONSTRUCTION

Designed around cast body and cover shapes the TWINRO pump offers a low cost unit with minimum material requirements. The pumping element consists of two contra-rotating shafts from which right hand and left hand epicycloid screw shapes are accurately machined. The screwset conveys the fluid being pumped from each end and out through the centre. The screw shafts are carried in roller bearings at the drive end and ball bearings at the non drive (gearcase) end. The driven (lower) screw is synchronised from the driving (upper) screw by a pair of hardened and ground timing gears.

OUTBOARD BEARING PUMPS (for non lubricating liquids) are equipped with four mechanical seals keeping the bearings and timing gears external from the pumped liquid. Drive end roller bearings are provided grease packed. An oil bath is provided at the non drive end for splash lubrication of the timing gears and ball bearings.

INBOARD BEARING PUMPS (for lubricating liquids) are provided with one mechanical seal on the drive shaft only. The liquid being pumped lubricates the bearings and timing gears.

Relief Valve Design and Operation

The valve is of the disc type with an attached dashpot and spring. Under normal operation a very small proportion of liquid from the pump discharge leaks past the clearances between the skirt and cylinder (Fig. 1). To prevent pressure building up the liquid drains back to suction through orifice "O".

Under pressure build up the relief valve starts to open, against the spring, exposing slot "S" to discharge pressure (Fig. 2). This allows the pressure to enter area "A" and quickly complete the opening of the relief valve to fully by pass the flow.

When the pressure drops the spring pushes the disk back on the seat forcing the liquid in area "A" back through slot "S". When the slot "S" is completely blanked off by the cylinder wall all the liquid is constrained to flow back through the orifice "O". This constraint has a dampening effect which prevents the relief valve slamming onto its seat.

Rapid Opening, Controlled Damped Closing.
Relief Valve Jacking Device

As an option TWINRO pumps can be fitted with a jacking device to manually lift the relief valve off its seat. This has the operational advantage of being able to circulate pumped liquid around the pump to aid extreme discharge or suction conditions. The device has proved extremely useful in aiding cold start conditions where the liquid in the discharge line is below normal pumping temperature. Another useful application is the partial circulation of discharge liquid back to suction to aid high suction lift applications at the end of barge or tank emptying.

OPERATION OF THE JACKING DEVICE DOES NOT ALTER PRE SET RELIEF VALVE SPRING PRESSURE.
<table>
<thead>
<tr>
<th>Construction Feature</th>
<th>Stock Components</th>
<th>Special Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing and Covers</td>
<td>Cast Iron&lt;br&gt;Cast Steel</td>
<td>S.G. Iron&lt;br&gt;Stainless Steel&lt;br&gt;Bronze</td>
</tr>
<tr>
<td>Screwset</td>
<td>Carbon Steel</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Mechanical Seals</td>
<td>DIN 24960&lt;br&gt;L,N Long Series</td>
<td>DIN 24960&lt;br&gt;L,K Short Series&lt;br&gt;(with Spacer)</td>
</tr>
<tr>
<td>Relief Valve</td>
<td>Integral&lt;br&gt;with Pump</td>
<td>Blanked off&lt;br&gt;(for System Relief Valve)&lt;br&gt;Relief Valve Jacking Device</td>
</tr>
<tr>
<td>Baseplate</td>
<td>Channel Steel&lt;br&gt;Fabricated Steel&lt;br&gt;Cast Iron&lt;br&gt;(with Drip Rim Drain and grout facility)</td>
<td>Drip Rim Drain and Grout facility on steel base</td>
</tr>
<tr>
<td>Coupling</td>
<td>Flexible Non Spacer Type</td>
<td>Flexible Spacer Type</td>
</tr>
<tr>
<td>Coupling Guard</td>
<td>Aluminium</td>
<td>Steel&lt;br&gt;Brass</td>
</tr>
<tr>
<td>Paint Finish</td>
<td>Standard Industrial System</td>
<td>Two Pack Epoxy or other systems for Hostile and Offshore Environments</td>
</tr>
<tr>
<td>Testing</td>
<td>Standard Works&lt;br&gt;Pressure and Performance Tests</td>
<td>Witnessed Tests&lt;br&gt;Noise and Vibration Tests&lt;br&gt;NPSH Test&lt;br&gt;Custom Tests&lt;br&gt;Plotted Test Curves</td>
</tr>
</tbody>
</table>
FLOW RANGE
(Pump frame size is nominal design flow in M³/hr e.g. W80 is nominally an 80 M³/hr pump)

APPROXIMATE DIMENSIONS
(The W40 size is also available in vertical format)

<table>
<thead>
<tr>
<th>PUMP SIZE</th>
<th>W40</th>
<th>W80</th>
<th>W125</th>
<th>W225</th>
<th>W375</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUCTION</td>
<td>4&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>8&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>DISCHARGE</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>8&quot;</td>
</tr>
</tbody>
</table>

Standard flanges are to ANSI dimensions
IRON - ANSI 125FF, STEEL - ANSI 150RF
DIN PN16 flanges are also available

#Pumps can be constructed with suction left (as shown) or suction right, to suit installation.
Approximate dimensions (mm). DO NOT use for installation purposes.

<table>
<thead>
<tr>
<th>PUMP SIZE</th>
<th>PUMP ONLY</th>
<th>UNIT</th>
<th>FRAME</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>W40</td>
<td>300</td>
<td>415</td>
<td>435</td>
<td>341</td>
<td>310</td>
<td>120</td>
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<tr>
<td>W80</td>
<td>200</td>
<td>260</td>
<td>510</td>
<td>490</td>
<td>195</td>
<td>165</td>
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<tr>
<td>W125</td>
<td>279</td>
<td>290</td>
<td>570</td>
<td>555</td>
<td>230</td>
<td>200</td>
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<tr>
<td>W225</td>
<td>315</td>
<td>345</td>
<td>709</td>
<td>621</td>
<td>300</td>
<td>250</td>
</tr>
<tr>
<td>W375</td>
<td>355</td>
<td>390</td>
<td>771</td>
<td>739</td>
<td>350</td>
<td>300</td>
</tr>
</tbody>
</table>

*Dimensions are given for the smallest and largest motor sizes for each pump.

Details shown in this brochure are for guidance only.
Specifications and technical data may be changed without notice.

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