The CROSS Series 50 gear pumps/motors feature a gear tooth design that provides more displacement within a given package size. The gear tooth design and pressure balanced loading plates provide for a high volumetric and overall efficiency while operating at a low noise level. Available in 7 sizes, with displacements from 1.52 to 5.20 cubic inches per revolution, this compact unit can deliver up to 45 US. gpm. in a space less than 6-1/2" x 5-3/4" x 7-1/4".

MATERIAL SPECIFICATIONS
Body and end covers ................................................................. Die cast aluminium alloy
Gears ......................................................................................... Sintered metal
Shafts ........................................................................................ Hardened steel
Seals ........................................................................................ Buna N
Bearings ..................................................................................... Pressure lubricated, Teflon impregnated sleeve

GENERAL SPECIFICATIONS
Displacement sizes

<table>
<thead>
<tr>
<th>Displacement</th>
<th>cu.in./Rev</th>
<th>cc/Rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.52</td>
<td>24.9</td>
<td>411.0</td>
</tr>
<tr>
<td>1.95</td>
<td>32.0</td>
<td>519.8</td>
</tr>
<tr>
<td>2.32</td>
<td>38.0</td>
<td>616.0</td>
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<tr>
<td>2.74</td>
<td>44.9</td>
<td>720.5</td>
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<tr>
<td>3.30</td>
<td>54.1</td>
<td>874.4</td>
</tr>
<tr>
<td>3.80</td>
<td>62.3</td>
<td>995.7</td>
</tr>
<tr>
<td>5.20</td>
<td>85.2</td>
<td>1371.9</td>
</tr>
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</table>

HYDRAULIC PUMPS
Rated working pressure (max. relief valve setting at full flow) ........................................ 3000 psi (207 bar)
Maximum shock & surge pressure ....................................................................................... 3500 psi (242 bar)
Maximum flow rate (delivery) ........................................................................................... 45 gpm (170 l/m)
Maximum speed (continuous - see Inlet Vacuum Curves) .................................................. Up to 3000 RPM
Maximum horsepower (at rated speed and pressure) .......................................................... 78 hp (58 kw)
Mounting (any position) ..................................................................................................... SAE ‘B’ size, 2-Bolt
Weight ................................................................................................................................. Approx. 19 lbs (8.6 kg)

HYDRAULIC MOTORS
Rated working pressure (max. relief valve setting at full flow) ........................................ 3000 psi (207 bar)
Maximum shock & surge pressure ....................................................................................... 3500 psi (242 bar)
Maximum flow rate (input) ................................................................................................. Up to 56 gpm (227 l/m)
Maximum speed (continuous) ............................................................................................ Up to 3000 RPM
Maximum horsepower (at rated speed and pressure) ........................................................ Up to 100 hp (74.6 kw)
Mounting (any position) ..................................................................................................... SAE ‘B’ size, 2-Bolt
Weight ................................................................................................................................. Approx. 19 lbs (8.6 kg)
STANDARD FEATURES
• Rotation: Bi-directional (Dual Rotation)
• Ports: Side, SAE #16 (1-5/16” - 12) U.N. O’Ring thread
• Internal check valves (no external drain required if back pressure is below shaft seal rating)
• Shaft: 7/8” Dia Woodruff keyed (short)
• Shaft Seal: 250 psi. (17 bar)

OPTIONAL FEATURES AVAILABLE
• Ports: Rear inlet and outlet location (See ‘How to Order’ for port size options)
• Shaft: 7/8” Dia SAE splined (13 tooth)

NOTE: Shafts ‘B’ and ‘D’ are available for quantity indent order only.

DIMENSIONAL DATA in inches and (millimeters)

<table>
<thead>
<tr>
<th>DISPLACEMENTS (Cu.In./Rev.) (cc/rev)</th>
<th>1.52</th>
<th>1.95</th>
<th>2.32</th>
<th>2.74</th>
<th>3.30</th>
<th>3.80</th>
<th>5.20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24.9</td>
<td>32.0</td>
<td>38.0</td>
<td>44.9</td>
<td>54.1</td>
<td>62.3</td>
<td>85.2</td>
</tr>
<tr>
<td>'A' Dimension (Inches) (mm)</td>
<td>5.60</td>
<td>5.80</td>
<td>5.96</td>
<td>6.15</td>
<td>6.40</td>
<td>6.62</td>
<td>7.21</td>
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<tr>
<td></td>
<td>142.2</td>
<td>147.3</td>
<td>151.3</td>
<td>156.2</td>
<td>162.6</td>
<td>168.1</td>
<td>183.1</td>
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<tr>
<td>'B' Dimension (Inches) (mm)</td>
<td>4.23</td>
<td>4.43</td>
<td>4.56</td>
<td>4.78</td>
<td>5.03</td>
<td>5.25</td>
<td>5.84</td>
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<tr>
<td></td>
<td>107.4</td>
<td>112.5</td>
<td>115.8</td>
<td>121.4</td>
<td>127.8</td>
<td>133.3</td>
<td>148.3</td>
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</table>

OUTPUT SHAFT

<table>
<thead>
<tr>
<th>SHAFT ‘A’</th>
<th>SHAFT ‘B’</th>
<th>SHAFT ‘C’</th>
<th>SHAFT ‘D’</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 Tooth, 16/32 pitch; 30° pressure angle; Flat root side fit; Class I.</td>
<td>15 Tooth, 16/32 pitch; 30° pressure angle; Flat root side fit; Class I.</td>
<td>Woodruff Key; 1” Diameter x 1.4” wide.</td>
<td>Woodruff Key; 1” Diameter x 1.4” wide.</td>
</tr>
</tbody>
</table>
GEAR PUMP - DELIVERY CHARACTERISTICS

TYPICAL PERFORMANCE DATA

MODEL 50P015

MODEL 50P027

MODEL 50P019

MODEL 50P033

MODEL 50P023

MODEL 50P038

MODEL 50P052
CROSS GEAR PUMPS/ MOTORS

GEAR PUMP - SUCTION CHARACTERISTICS

TYPICAL PERFORMANCE DATA

MODEL 50P015

MODEL 50P019

MODEL 50P023

MODEL 50P027

MODEL 50P033

MODEL 50P038

MODEL 50P052

DO NOT operate above the RPM-inlet vacuum curve or 8 in. Hg. for specific inlet port sizes shown.
TYPICAL PERFORMANCE DATA

VOLUMETRIC EFFICIENCY VS RPM AT 120°F

STARTING TORQUE (IN.-LBS.) VS PRESSURE (PSI)
## HOW TO ORDER

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Special Options</th>
<th>Size cu.in./rev x 0.1</th>
<th>Rotation</th>
<th>Mounting</th>
<th>Shaft Size &amp; Type</th>
<th>Location Code</th>
<th>Ports</th>
<th>Size</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>P* (Pump)</td>
<td>O None H* 250 psi Shaft Seal</td>
<td>15 19 23 27 33 38 52</td>
<td>D* Dual R Right L Left</td>
<td>B* SAE ‘A’ 2-Bolt</td>
<td>A 7/8&quot; Spline B* 1&quot; Spline C 7/8&quot; Dia Keyed</td>
<td>D 7/8&quot; Dia Keyed (Long)</td>
<td>SA 1-7/8&quot; UN O’Ring</td>
<td>1-5/16&quot; UN O’Ring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M (Motor)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SB 1-5/8&quot; UN O’Ring</td>
<td>1-5/16&quot; UN O’Ring</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>SC 1-5/16&quot; UN O’Ring</td>
<td>1-5/16&quot; UN O’Ring</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>RD 1-7/8&quot; UN O’Ring</td>
<td>1-5/16&quot; UN O’Ring</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RE 1-5/8&quot; UN O’Ring</td>
<td>1-5/16&quot; UN O’Ring</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RF 1-5/16&quot; UN O’Ring</td>
<td>1-5/16&quot; UN O’Ring</td>
<td></td>
</tr>
</tbody>
</table>

* Standard

**EXAMPLE: 50PH23DBCSC**
Describes a Series 50 Gear Pump/Motor fitted with a high pressure shaft seal; a displacement of 2.3 cu.in./rev; Bi-directional rotation; SAE ‘B’ 2-Bolt Mount, 7/8” Dia keyed shaft and 1-5/16” UN O’Ring side Inlet & Outlet Ports.

**NOTE:** Series 50 Pumps only are stocked. Because of the high pressure shaft seal and the dual rotation feature they can be substituted where required for use as motors. When used as a motor a case drain connection is only required when the outlet/return pressure is likely to exceed 250 psi.