A simple, economical, direct-drive progressing cavity pumping system
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An innovative approach to pumping that combines simple mechanics and industry-leading variable-speed well control in a compact, lightweight, unobtrusive solution with significant cost and performance advantages over traditional approaches.

Revolutionary Simplicity
Unico’s direct-drive PCP Progressing Cavity Pump system is an innovative alternative to conventional belted PCP drives as well as sucker-rod pumping units. The patented and patents pending PCP system provides outstanding performance and reliability using sophisticated controls and simple mechanics. The ultracompact package features a minimal footprint and very low profile. Since it has no dangerous exposed moving parts, the PCP unit is a completely safe solution for use in urban installations where other types of lifts could be hazardous.

PCP capacity for the smallest and largest models. Analysis is based on an overall system lift efficiency of 50%. The vertical span of each region is based on the range of available motor sizes for each model. Full torque is available through 425 rpm for the standard-duty unit and 300 rpm for the heavy-duty unit. Gearbox input power limitations of 30 hp and 150 hp for the standard- and heavy-duty units, respectively, result in a reduction of rod torque above those speeds.

The standard-duty PCP system is ideal for stripper well and coal-bed methane production. The heavy-duty unit is best suited for high-power applications such as heavy oil production.
Direct Drive
The PCP system uses a direct-drive approach to convert the high speed of the motor to rod speed. The unit mounts directly over the wellhead on either the tubing or casing. The polished rod is suspended from a thrust bearing integrated into the gearbox.

Permanent Magnet Motors
The PCP system is powered by a high-efficiency permanent magnet (PM) motor that provides several advantages over conventional motors. The PM motor backspin speed is easily limited by a simple set of braking resistors and a normally closed contactor, thereby eliminating the need for the complex braking systems found on conventional PCP systems. The reconnectable PM motors can be run at maximum speeds of 900, 1800, or 3600 rpm to provide a broad range of capability within a single unit. High gearbox ratios enable higher motor speeds, as compared to the motors used on conventional belted systems. This results in a reduction in motor frame size and weight compared to conventional 1200 rpm motors of about 33% for the 1800 rpm case and 66% for the 3600 rpm option.

Compact
With its low profile and wellhead mount, the PCP system fits where traditional pumping units cannot. It is ideal for sites where wells are packed closely together in pad-mounted applications or for use under traveling irrigation systems.

Easy to Install
The PCP unit is very compact, lightweight, and easy to transport. No specialized or heavy equipment is required, which saves on installation costs. It can be carried in a light-duty truck and installed with a 1-ton rig, small picker, or even a backhoe. Installation is quick and easy and can be handled by two people. Units can be installed and fully operational within a couple of hours.

Remote Wells
A number of options are available for powering the PCP system in unattended remote locations where conventional single- or three-phase power is unavailable. Solar panels and solar/wind hybrid systems can be used with smaller PCP units. With solar-powered systems, the control optimizes power consumption to ensure that the full output of the collecting array is utilized at all times. The PCP system can also be used with engine-driven generators, including Unico’s GPL® gas-powered lift system, which efficiently powers the system using wellhead natural gas or liquid propane.

By combining different gear boxes (g), motors (mmm), and drives, the PCP system provides maximum application flexibility with minimal spare parts.

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Maximum Speed</th>
<th>Maximum Torque</th>
<th>Maximum Power</th>
<th>Maximum Load</th>
<th>Polished Rod</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rpm</td>
<td>in-lb (N·m)</td>
<td>hp (kW)</td>
<td>lb (kg)</td>
<td>in (mm)</td>
</tr>
<tr>
<td>P045g-mmm</td>
<td>0-450</td>
<td>4,500 (508)</td>
<td>15 (11)</td>
<td>17,600 (7,983)</td>
<td>1.25 (31.8)</td>
</tr>
<tr>
<td>P085g-mmm</td>
<td>0-450</td>
<td>8,500 (960)</td>
<td>30 (22)</td>
<td>17,600 (7,983)</td>
<td>1.25 (31.8)</td>
</tr>
<tr>
<td>P137g-mmm</td>
<td>0-450</td>
<td>13,700 (1,548)</td>
<td>50 (37)</td>
<td>43,000 (19,504)</td>
<td>1.50 (38.1)</td>
</tr>
<tr>
<td>P239g-mmm</td>
<td>0-450</td>
<td>23,900 (2,700)</td>
<td>75 (55)</td>
<td>43,000 (19,504)</td>
<td>1.50 (38.1)</td>
</tr>
<tr>
<td>P381g-mmm</td>
<td>0-450</td>
<td>38,100 (4,305)</td>
<td>150 (110)</td>
<td>43,000 (19,504)</td>
<td>1.50 (38.1)</td>
</tr>
<tr>
<td>P708g-mmm</td>
<td>0-450</td>
<td>70,800 (7,969)</td>
<td>250 (185)</td>
<td>43,000 (19,504)</td>
<td>1.50 (38.1)</td>
</tr>
</tbody>
</table>
The degree of sophistication of the PCP system controls can be tailored to the installation. In its simplest form, the unit can be run across the line using a timer to provide basic duty-cycle operation. Alternately, a soft starter may be used to minimize inrush currents and extend equipment life. For more demanding applications, a Unico variable-speed drive (VSD) with integrated PCP software provides unsurpassed control with a full complement of features.

Unico’s PCP control incorporates patented backspin and sensorless fluid level control software that optimizes production while protecting the pumping system. Fluid level is optimally regulated by modulating pump speed. The control also provides well data reporting, surface and downhole velocity plotting, remote access capability, embedded PLC, automatic fault restarting, and more.

Well data, including surface and downhole velocity plots, is readily available.

The PCP system is the ideal choice for environmentally sensitive installations. It is quiet, unobtrusive, and does not require site grading, mounting pads, or other well site disruptions. Its low profile and small footprint allow it to blend in where other units would be offensive or prohibited by regulation.

Global Monitoring
Unico’s GMC® Global Monitoring and Control service provides comprehensive Web-based monitoring and reporting capabilities. It is an efficient, cost-effective way to stay connected to daily operations. The service provides real-time monitoring of production and performance data, historical data for analysis, automated well reports, as well as email notification of alarms and other conditions. Operators can view data for all fields, a single field, or an individual well.