A simple, economical, ultracompact sucker-rod pumping system

C R P®

Crank Rod Pump

UNICO
A simple, economical, ultracompact sucker-rod pumping system

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 CRP® Crank Rod Pump is an innovative alternative to conventional beam pumps and progressing cavity pumps. The CRP® system provides outstanding performance and efficiency 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 CRP® unit is a completely safe solution for use in urban installations where other types of lifts could be hazardous. The system is ideal for shallower, low-flow wells, including those in remote locations without electrical service.

CRP® capacity for the smallest and largest models. Analysis is based on plunger diameters from 1.25 to 3.75 inches and associated API 76 tapered rod designs. Maximum pump flows and depths are associated with maximum and minimum plunger diameters, respectively. The vertical span of each region is based on the range of available motor sizes for each model.
Direct Drive
The CRP® system uses a simple offset crank mechanism to convert variable-speed rotary motion into vertically reciprocating motion that drives the rod string. The unit mounts directly over the wellhead. The polished rod is suspended from a sliding block inside the unit by a conventional rod clamp. The rod is allowed to float in case the pump or rod sticks. An induction motor, coupled to crank levers or arms through a gearbox, cycles the slide up and down along guide rails to actuate the rod.

Compact
With its slender profile and wellhead mount, the CRP® system fits where traditional lifts cannot. It is ideal for offshore rigs or sites where wells are packed closely together. In challenging dual-zone applications, Unico CRP® and LRP® systems can be installed right next to each other to produce at two different depths.

Easy to Install
The CRP® 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
The CRP® system is optimized for unattended operation using solar panels or generators in remote locations where conventional single- or three-phase power is unavailable. A power demand leveling feature intelligently regulates pump operation to maintain constant power draw. In a solar-powered application, the pump will operate whenever there is sufficient solar energy to power the unit. Power utilization is maximized so that the entire available output of the solar collecting array is put to use at all times rather than wasted. Surplus energy is stored in rotating inertia and used to flatten the pumping velocity, resulting in a higher stroke rate. When used with an engine-driven generator, the system automatically limits peak power draw to prevent stalling and minimize engine wear caused by repeatedly revving the engine to accommodate load fluctuations. This extends the life of the engine and allows the use of a much smaller generator. For even greater efficiency, wellhead natural gas can be recycled to power the system using Unico’s GPL® gas-powered generator.

Resource Table

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Rod Stroke (in)</th>
<th>Rod Force (lb)</th>
<th>Rod Speed (fpm)</th>
<th>Pump Speed (spm)</th>
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<tr>
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<td>4-80</td>
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<td>1-25</td>
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</tbody>
</table>

By combining different gearboxes (g), motors (mmmm), and drive, the CRP® system provides maximum application flexibility with minimal spare parts.
Well data, including surface and downhole dynamometer plots, is readily available.

Advanced Control
The CRP® system incorporates Unico’s patented SRP sucker-rod pump control software to optimize production while protecting the pumping system. Sophisticated variable-speed control achieves motion profiles that are impossible through mechanical means. Pump fill is optimally regulated by modulating pump speed. An automated valve check determines standing and traveling valve leakage. The control also provides well data reporting, surface and downhole dynamometer plotting, remote access capability, embedded PLC, automatic fault restarting, and more.

Low-Flow Wells
Low-flow wells are a problem for conventional jack pumps, which cannot pump continuously at slow speeds and must stop to prevent overpumping. Start/stop operation allows a well to sand in, causing damage to the pump. The CRP® pumping system can operate at very low speeds to keep wells producing without pumping off or stopping.

Retrofits
Since it can operate at a much slower stroke rate, the CRP® unit is an ideal retrofit solution for jack pumps that no longer perform. The unit can be mounted in place over the wellhead without having to remove the old mechanism. The CRP® system can also be moved from well to well for temporary installation or to prove reserves.

Economical
The CRP® system is a smart investment that quickly pays for itself in reduced installation, operation, and maintenance costs. The system can be purchased for a fraction of what a comparable jack pump would cost without any controls. Installation is significantly less expensive because the unit is so easy to transport and set up. Since the unit bolts directly to the wellhead, concrete and gravel pads and other expensive site preparations are no longer needed. Increased production increases revenue and reduced downtime lowers operational costs, making the the CRP® system a truly economical solution.

Environmentally Friendly
The CRP® 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. The unit fits beneath traveling sprinkler systems in irrigation applications.

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.

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Unico is a leading global innovator of motion-control solutions for industry. Founded in 1967, the company develops, manufactures, and services variable-speed drives, application-engineered drive products, integrated drive systems, and ancillary products that improve operations by increasing productivity, safety, and equipment life while lowering energy and maintenance costs.