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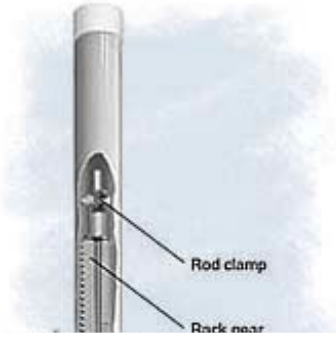
**Product Watch**

**The LRP™: A Fresh Approach to Sucker-Rod Pumps**

Imagine. It's your first visit to a new well site. You've seen the reports...this new installation's a real producer, all right, and you're anxious to check it out. As you turn down the access road, you expect to see the familiar horse head bobbing over the treetops. You know it must be up ahead, but you can't see anything. Cresting the hill, you make out in the distance a storage tank, piping, a vent stack...but where's the pump? In place of the massive walking beam you were expecting to see, there's only a slender metal tube rising from the wellhead. As you pull up nearby, you notice nothing's moving, all is quiet. A quick check reading with your PDA shows that the well is, indeed, pumping fluid. What's going on here? Welcome to Unico's latest innovation, the LRP™ Linear Rod Pump.



The LRP™ pumping system is revolutionary departure from traditional sucker-rod artificial lift systems. The patent-pending LRP™ system combines variable-speed control, simple mechanics, and industry-leading control software into a compact, lightweight, unobtrusive solution. It's a fresh approach that provides significant cost and performance benefits over conventional systems.



The secret to the LRP™ system is that it controls the rod string directly using the bidirectional servo-positioning capabilities of a flux vector variable-speed drive and a simple rack-and-pinion mechanism. This eliminates the cumbersome mechanics typically used to translate motion to the rod string while

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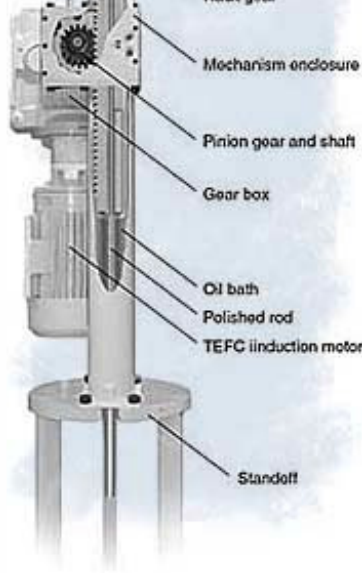
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*The LRP™ pumping unit mounts directly to the wellhead. The polished rod runs through a channel inside the rack and is suspended from the top by a conventional rod clamp. The rod is allowed to float inside the rack should the pump or rod stick. An induction motor, coupled to the rack-and-pinion mechanism through a gear box, cycles the rack up and down to reciprocate the rod. The rack is lubricated each stroke by submersion into a fully contained oil bath.*

providing superior control. The efficient, low-inertia design uses a much smaller motor and gear box than conventional jack pumps. Programmable electronic motion profiles extend the effective stroke to that of a much larger unit. The physical size difference can be startling.

The LRP™ unit is extremely economical and easy to install. The total system costs a fraction of a comparable jack pump without controls. Transportation, site preparation, and installation costs are minimal. The LRP™ unit mounts directly to the wellhead, eliminating the need for a concrete pad and other special site preparations. It can easily be transported in a pickup truck, handled by two people, and installed with a small rig or picker. Units are up and running within two hours.

With its compact design, the LRP™ unit blends into the landscape where conventional pumps would be offensive or prohibited by regulation. It has a very low profile, no visible moving parts, is quiet, and nondisruptive to the well site. This makes it especially appealing for environmentally sensitive installations.

The LRP™ leverages Unico's patented SRP sucker-rod pump control software to optimize production and protect the pumping system. Features include superior speed control, regulation down to one stroke per minute, software-adjustable stroke length and spacing, optimized pump fill, fluid pound reduction, automated valve check, remote reporting, and more.

LRP™ units come in a variety of models ranging from a 32" stroke with 4,000 lb. capacity to a 56" stroke with 12,000 lb. capacity. For more information on how the LRP™ system can improve your operations, please [contact us](#).

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## **New High-Output Engine Provides Compact Gas-Powered Lift Package**

The new high-output 3.0 liter GM Vortec engine has been added to



the Unico GPL™ Gas-Powered Lift product line. This unit operates artificial lift systems with a total power capacity of 60 hp (48 kW) at an engine speed of 2,400 rpm in a 42" by 42" by 55" package.



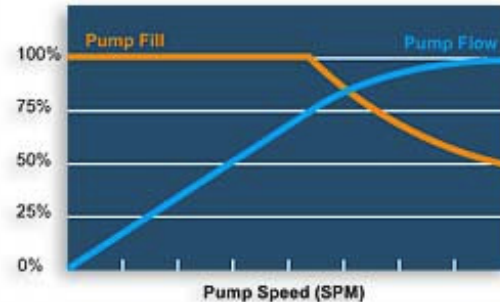
The unit offers a nice extension to the 40 hp capacity of the 1.6 liter engine in similar compact package. Both units are configured to include up to four variable-speed drives for independent operation of ESP, PCP, or SRP artificial lift applications. To learn more about the GPL™ Gas-Powered Lift systems, please [contact us](#).

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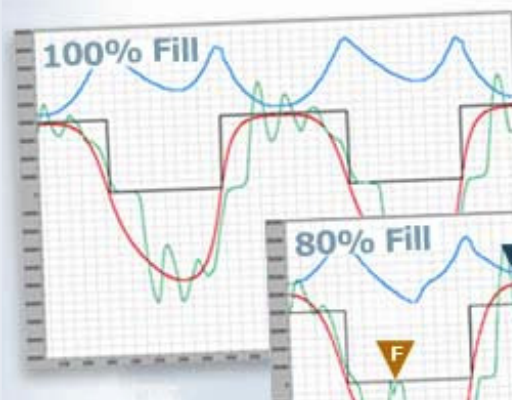
## Feature Focus

### Soft Landing Speed Profile Increases Sucker-Rod Pump Production

Sucker-rod pump production can generally be optimized by operating at partial pump fill percentages. Pump production for a full pump increases in proportion to pumping unit speed. As pump fill drops below 100%, fluid production increases with speed, but at a diminishing rate. Foamy fluid mixtures may require pump fill percentages as low as 60% to maximize oil production. The drawback of operating at reduced pump fills is that it causes fluid pound and associated rod stress.



Unico's Soft Landing Control feature reduces rod stress and associated damage without sacrificing pump production. The downstroke speed of the pumping unit is reduced until the plunger enters the fluid to soften the landing and then increased through the remainder of the pump stroke to maximize production.



*The pumping unit slows down [1] to minimize the impact of fluid pound [F]. Once the plunger has entered the fluid, the pump will speed up [2] to maximize production. It maintains average speed by going faster during the upstroke [3].*



[Contact us](#) for more information about soft landing speed profiling.

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## Technically Speaking

### SPE Paper Studies Production Increases at PDVSA



*Production Increases at PDVSA Using an Improved SRP Control* is the title of a paper presented by Unico development engineer Ron Peterson at the 2006 SPE Annual Technical Conference and

Exhibition held in San Antonio, Texas, September 24-27, 2006. Peterson prepared the paper with the cooperation of Alexander Gomez of Unico's Venezuela office and Carlos Brunings, SPE, and Wilfredo Quijada, SPE, of PDVSA. The abstract of the paper is given below. The full version of [SPE 103157](#) can be purchased online from SPE.

#### Abstract:

"Sucker Rod Pumping (SRP) systems have used various control methods to optimize production, improve energy efficiency, and reduce maintenance. These systems typically use Rod Pump Controllers (RPCs) or timers to cycle the rod pumping unit on and off. Variable Speed Drives (VSDs) are occasionally used in conjunction with RPCs to improve operation by modulating pump speed. An improved SRP control that combines the RPC and VSD functions in an integrated system was installed on approximately 100 rod pumping systems at PDVSA starting in January 2004. The improved control resulted in a median production increase of 21%.

Embedded optimization controls in the VSD allow PDVSA engineers to preset a desired target pump fill based upon an Optimizer ID routine that samples production rates at various operating speeds and pump fill values over several days. The control subsequently adaptively modulates the pumping speed profile accordingly, thereby maintaining continuous operation at the identified optimal target pump fill. By maintaining a constant fluid level rather than the traditional cycling of fluid level between two limits, production losses associated with cycling above the target IPR well flowing pressure are

eliminated. Furthermore, continuous and adaptive downhole pump speed controls allow the target IPR well flowing pressure to be reduced while simultaneously providing better protection for pumping equipment.

In addition, the VSD exercises the pump through controlled sequences that automatically identify other valuable system characteristics such as pump leakage, traveling/standing valve problems, pumping unit characteristics, counterbalance characteristics, and motor electrical parameters."

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## What's Coming Up

### In Future Issues...

Look for the following articles in upcoming issues of *Oil & Gas Automation*

#### *Solutions:*

- Field tests of methods to eliminate rod pump gas locking and interference
- Reducing power consumption and improving power factor of beam pumps
- Using a torque economizer mode to improve efficiency and reduce gearbox stress
- Detecting stick/slip oscillations that fatigue rod-string couplings and reduce energy efficiency of PCPs
- Control options to ride through power disturbances

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