# L R P<sup>®</sup>

# Linear Rod Pump



A revolutionary

sucker-rod

artificial lift

system





# A revolutionary concept in sucker-rod artificial lift systems

Variable-speed control, simple mechanics, and industry-leading control software in a compact, lightweight, unobtrusive solution with significant cost and performance advantages over traditional approaches.





### **Direct Drive**

The LRP® system takes advantage of the motor reversing and servo positioning capabilities of a flux vector variable-speed drive to directly control the sucker rod using a simple rack-and-pinion mechanism. Direct control provides numerous benefits by eliminating the cumbersome, high-inertia mechanics of other systems. Compared to hydraulic reversing systems, the LRP® solution is much more elegant and capable, thanks to electronic control.

#### Simple Design

The LRP<sup>®</sup> 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



LRP® capacity for several 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.

# R O D

the rack-and-pinion mechanism through a gearbox, cycles the rack up and down to reciprocate the rod. The rack is lubricated with each stroke by submersion into a fully contained oil bath. A high-performance motor and line-regenerative drive can be used to achieve relatively high system efficiency, even on deep wells, without resorting to the massive counterweights used in conventional pumping systems.

#### Easy to Install

The LRP® unit is small, 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 or small picker. Installation is quick and easy and can be handled by two people. Units can be installed and fully operational within a couple of hours.



Compact LRP® units are easy to transport





The unit installs quickly and mounts directly to the tubing or well casing

#### Portable

Since it's easy to transport and commission, the LRP® system can easily be moved from well to well for temporary installations or to prove reserves.

#### Efficient

The low-inertia design of the LRP® system allows it to use a much smaller motor and gearbox than a conventional jack pump. Jack pumps are often oversized to provide the necessary capability. Programmable motion profiles give the LRP® system the effective stroke of a much larger unit. Therefore, a much smaller LRP® unit will provide the same or better production at less cost.

#### **Economical**

The LRP® 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 pump jack without any controls would cost. 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 LRP® system a truly economical solution.

# Environmentally Friendly

The LRP® 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 LRP® system blends into its environment



Coal-bed methane installation

Model Number	Rod Stroke (in)	Rod Force (lb)	Rod Speed (fpm)	Pump Speed (spm)
L073g-mmmm-020	20	4,000	10-250	0.5-25.0
L073g-mmmm-032	32	4,000	10-250	0.5-25.0
L137g-mmmm-032	32	7,000	10-250	0.5-25.0
L239g-mmmm-032	32	12,000	10-250	0.5-25.0
L381g-mmmm-032	32	15,000	10-250	0.5-25.0
L381g-mmmm-044	44	15,000	10-250	0.5-25.0
L381g-mmmm-056	56	15,000	10-250	0.5-21.4
L381g-mmmm-064	64	15,000	10-250	0.5-18.8
L381g-mmmm-086	86	15,000	10-250	0.5-14.0
L826g-mmmm-086	86	30,000	10-375	0.5-21.0
L826g-mmmm-100	100	30,000	10-375	0.5-18.0
L826g-mmmm-120	120	30,000	10-375	0.5-15.0
L826g-mmmm-144	144	30,000	10-375	0.5-12.5

By combining a few different rack lengths, gearboxes (g), motors (mmmm), and drives, the LRP® system provides maximum application flexibility with minimal spare parts.







# **Advanced Control**

Line and Downhole DynaCauth and a market of the second se The LRP® system incorporates Unico's patented SRP suckerrod pump control software to optimize production while protecting the pumping system. Sophisticated variablespeed control achieves motion profiles that are impossible through mechanical means.

Well data, including surface and downhole dynamometer plots, is readily available Pump fill is optimally regulated by independently adjusting upstroke and downstroke speeds. Soft landing speed control minimizes fluid impact. 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



Sophisticated controls are protected inside rugged enclosures designed to withstand the environment

# Variable Pump Stroke/Position

Pump stroke length and spacing can easily be adjusted through software. Upper and lower pump positions are set independently, allowing maximum pump compression by minimizing pump clearance volume when in the full downward position.

# Superior Pump Speed Control

Downhole pump speed can be more precisely controlled due to the low inertia of the LRP® mechanism and the constant relationship between motor and rod speed. Pump speed, for example, is quickly reduced prior to fluid impact, attenuating the damaging effects of shock loads on the pump and rod during fluid pound. After fluid impact, speed is quickly increased to maximize production potential.

# Low-Speed Operation

The LRP® system can operate at speeds as low as 1 spm, as compared to pump jacks without gearbox wipers, which are typically limited to 4 to 5 spm.

## Remote Power

Unico's GPL® gas-powered generator can operate the LRP® system using wellhead natural gas for remote installations where electrical service is unavailable or cost prohibitive.



### **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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Protected by United States patent 7,168,924. Other patents are pending.

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Specifications subject to change without notice.