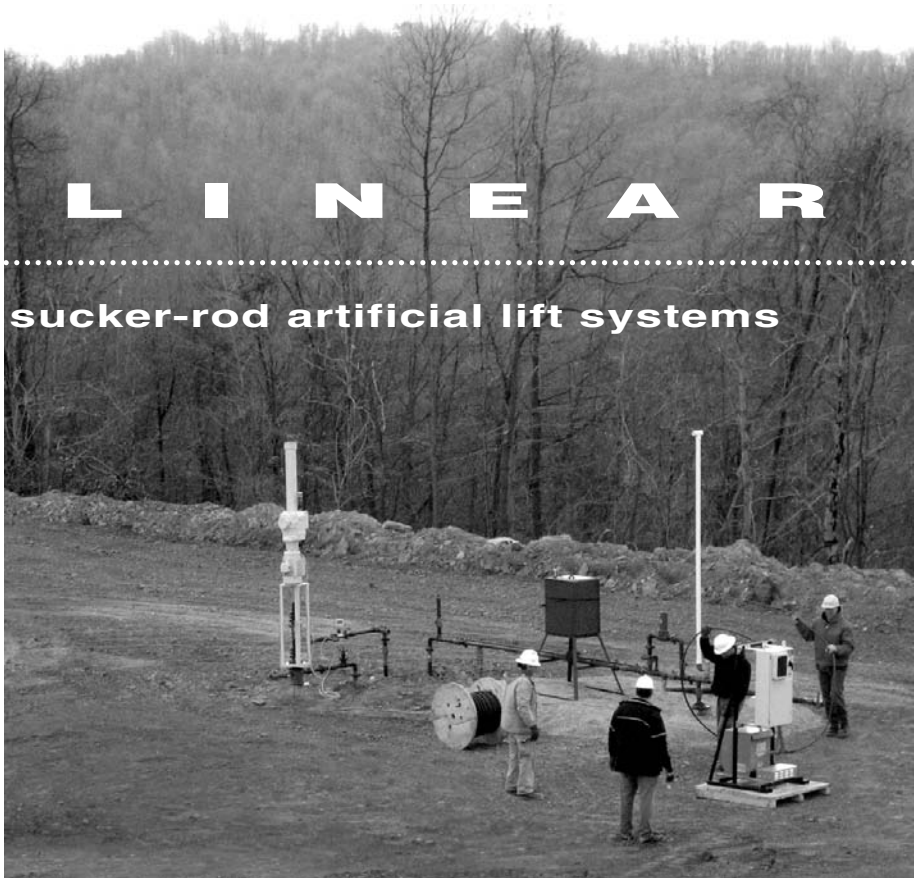
drives & systems

L R P™

Linear Rod Pump

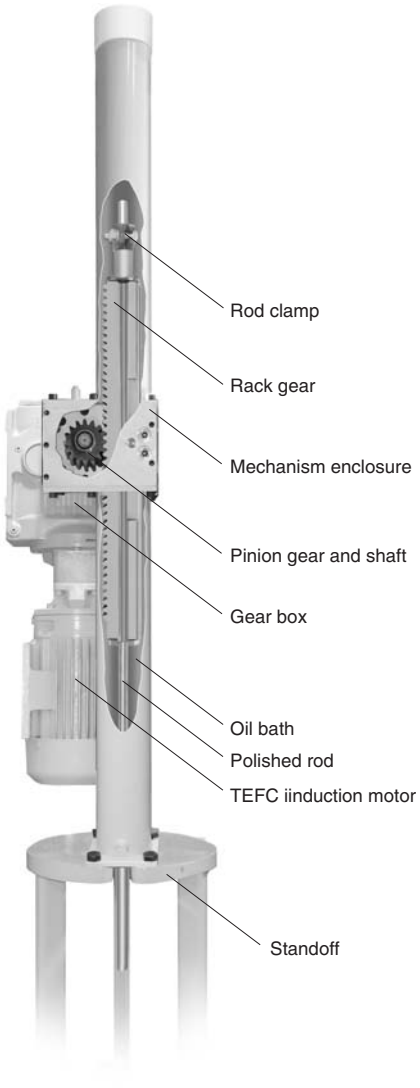
A revolutionary sucker-rod artificial lift system

L R P ™



A revolutionary concept in sucker-rod artificial lift systems

Variable-speed control, simple mechanics, and industry-leading control software into 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 with other reversing systems, such as hydraulic, the LRP™ solution is much more elegant and capable, thanks to electronic control.

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.

Compact LRP™ units fit two on a pallet

R O D P U M P

Efficient

The low-inertia design of the LRP™ system allows it to use a much smaller motor and gear box 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.

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.

The unit installs quickly and mounts directly to the stuffing box 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 installation or to prove reserves.

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 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 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.

Typical coal-bed methane installation

Model Number	Rod Stroke *(in)*	Rod Force *(lb)*	Rod Speed *(fpm)*	Pump Speed *(spm)*
L-073g-mmmm-032	32	4,000	5-200	0.5-20.0
L-137g-mmmm-032	32	7,000	5-200	0.5-20.0
L-239g-mmmm-032	32	12,000	5-200	0.5-20.0
L-381g-mmmm-044	44	20,000	7-275	0.5-20.0
L-381g-mmmm-056	56	20,000	9-350	0.5-20.0

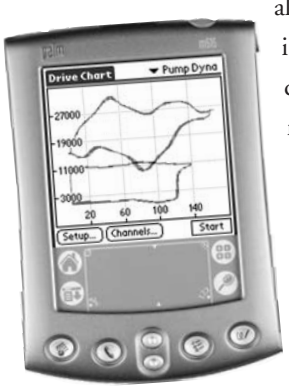
By combining a few different rack lengths, gear boxes (g), motors (mmmm), and drives, the LRP™ system provides maximum application flexibiity with minimal spare parts

CONTROL

Advanced Control

The LRP™ 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 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 restarting, and more.

Well data, including surface and downhole dynamometer plots, is readily available



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 gear box wipers, which are typically limited to 4 to 5 spm.

Options

Brake The LRP™ control incorporates a brake function that can actuate an external brake to prevent the rod from moving when the power is lost or when the motor is off.

Counterbalance If required, the load may be counterbalanced using an air cylinder through which the polished rod is threaded. A pressure sensor may be used to provide feedback, or the system will work without one.

Gas-Powered Generator Unico's GPL™ gas-powered generator can operate the LRP™ system using wellhead natural gas for applications where electrical service is unavailable or cost prohibitive.

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