Superior sucker-rod artificial lift system for deeper wells
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Variable-speed control, simple mechanics, and industry-leading control software in a relatively compact, lightweight, unobtrusive solution with significant cost and performance advantages over traditional systems.

Direct Drive
The HAP™ system takes advantage of modern control technology and a unique hydraulic circuit topology to provide superior performance compared to other hydraulic rod-pumping systems. The unit can be operated either from an electrical grid using a fixed-displacement pump coupled to an electric motor or using a variable-displacement pump coupled to an engine. The motor-driven system utilizes the motor reversing and servo positioning capabilities of a flux vector variable-speed drive to directly control the sucker rod using a simple hydraulic cylinder. Direct control provides numerous benefits by eliminating the cumbersome, high-inertia mechanics of conventional lift systems. Compared to other hydraulic systems, the HAP™ solution is much more elegant and capable, thanks to electronic control.

Simple Design
The HAP™ pumping unit mounts directly to the wellhead. The polished rod runs into a hollow rod cylinder and is suspended under the bottom of the cylinder by a conventional rod clamp. The rod is allowed to float inside the clamp assembly should the pump or rod stick. An induction motor, coupled to a fixed-displacement pump, cycles the cylinder up and down to reciprocate the rod. On engine-driven systems, rod motion is controlled using a variable-displacement pump. By varying the angle of the swashplate within the

HAP™ capacity for various models based on plunger diameters from 1.25 to 3.75 inches and associated API 76 tapered rod designs. The lines represent the maximum capacity for each air-balanced model with a 100 hp power unit.
pump, the fixed rotation of the engine is converted into continuously variable, reversible motion. A pneumatic counterbalance on air-balanced units replaces the massive counterweight of conventional systems and provides greater lifting force by storing energy during a portion of each downstroke and releasing it during the subsequent upstroke.

**Easy to Install**

Compared to conventional pumping systems, the HAP™ 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 flatbed truck and installed with a 1-ton rig. Installation is quick and easy and can be handled by two people. Units can be installed and fully operational within a few hours.

**Portable**

Since it’s easy to transport and commission, the HAP™ system can easily be moved from well to well for temporary installations or to prove reserves and well productivity.

**Efficient**

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

**Economical**

The HAP™ 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 HAP™ system a truly economical solution.

**Environmentally Friendly**

The HAP™ 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 narrow cross section and small footprint allow it to blend in where other units would be offensive or prohibited by regulation.

By combining a few different stroke lengths, gear boxes (g), motors (mmmm), and drives, the HAP™ system provides maximum application flexibility with minimal spare parts. Air-balanced units (A) offer higher production and depth.
**Advanced Control**

The HAP™ 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.

**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 HAP™ 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 HAP™ 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.

**Remote Power**

Unico’s GPL® gas-powered generator can operate the HAP™ 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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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.