

**H R P <sup>TM</sup>**

*Hydraulic Rod Pump*



*Superior  
sucker-rod  
artificial lift  
system for  
deeper wells*



# HRP™ HYDRAULIC

## Superior sucker-rod artificial lift system for deeper wells

*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.*

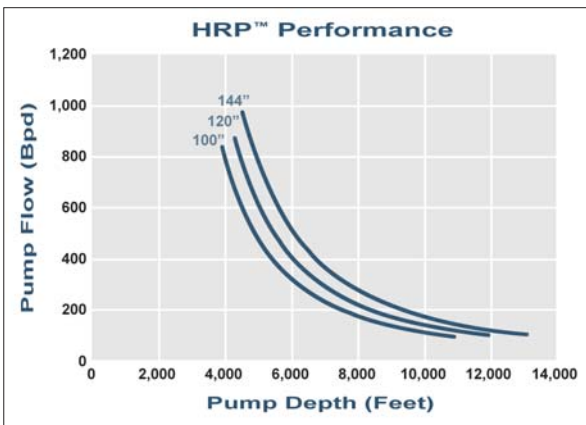


### Direct Drive

The HRP™ 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 HRP™ solution is much more elegant and capable, thanks to electronic control.

### Simple Design

The HRP™ 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



*HRP™ capacity for various models 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 lines represent the maximum capacity for each model.*



HRP™ power unit

# C R O D P U M P

angle of the swashplate within the 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 HRP™ 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 HRP™ 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 HRP™ 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



*The HRP™ unit installs quickly and mounts directly to the well casing. The unit features a self-erecting mounting stand that eliminates the need for an expensive rig during installation. The hinged mount allows the unit to swing out of the way for well servicing. The jacking mechanism is removable and can be moved from unit to unit as needed.*

capability. Programmable motion profiles give the HRP™ system the effective stroke of a much larger unit. Therefore, a much smaller HRP™ unit will provide the same or better production at less cost.

## Economical

The HRP™ 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 HRP™ system a truly economical solution.



## Environmentally Friendly

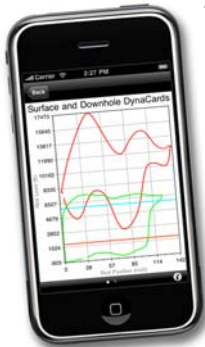
The HRP™ system is the ideal choice for environmentally sensitive installations. It is quiet, unobtrusive, and does not require site grading, mounting pads, or other well site disruptions. Its narrow cross section and small footprint allow it to blend in where other units would be offensive or prohibited by regulation.

Model Number	Rod Stroke (in)	Rod Force (lb)	Rod Speed (fpm)	Pump Speed (spm)
A754g-mmmm-100	100	40,000	10-500	0.5-20.0
A754g-mmmm-120	120	40,000	10-500	0.5-17.5
A754g-mmmm-144	144	40,000	10-500	0.5-15.0

*By combining a few different stroke lengths, gear boxes (g), motors (mmmm), and drives, the HRP™ system provides maximum application flexibility with minimal spare parts. Air-balanced units are prefixed (A).*

**C O N T R O L**

**Advanced Control**



The HRP™ 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.

*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 restarting, and more.



*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 HRP™ 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 HRP™ 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 HRP™ 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.*