



# Weatherford®

## WellPilot® Rod Pump Optimization Controller



Drilling



Evaluation



Completion



Production



Intervention

### Production optimization

- Artificial lift
- Control systems
- Flow measurement
- Reservoir monitoring
- Software
- Subsea production

A new generation in rod pump control.

## Features

- Guided setup screens for easy configuration and optimization
- Advanced Everitt-Jennings algorithm using finite differences for applying the wave equation
- Control using pump fillage
- Real-time production measurement built-in
- Historical data storage up to 120 days
- Open design accommodates future applications
- Well performance output for integration with pump performance tracking software

Since the advent of automation in the oilfield, rod pump control has become an industry standard. However, while the rod pump controller (RPC) has advanced in reliability and accuracy, the basic principles remain unchanged. Those principles include load and position control minimizing pump-off and providing data for analysis of the well. Many advances have been made to improve the communication of data, accuracy of the data collected and the logic used to provide control, but there has never been a revolutionary jump in technology that fundamentally advances the way rod pump control is done until now.

The WellPilot® rod pump optimization controller (RPOC) jumps the evolutionary trend of technology with major advances in electronics that include built-in capabilities for future advancements. To control the pumping system with unprecedented accuracy, the *WellPilot* controller uses an unabbreviated Everitt-Jennings algorithm<sup>1</sup> with finite differences to solve the wave equation. Weatherford has enhanced the algorithm and patented the application for use in the *WellPilot* controller and LOWIS™ software.

Why is this important? Abbreviated equations provide accurate well analysis in most situations, but not all. The comprehensive finite difference analysis provides highly accurate control by percent of pump fillage for all types of well configurations in all conditions.

Additionally, the *WellPilot* controller has a large number of input/output (I/O) ports that provide the framework for incorporating future devices.

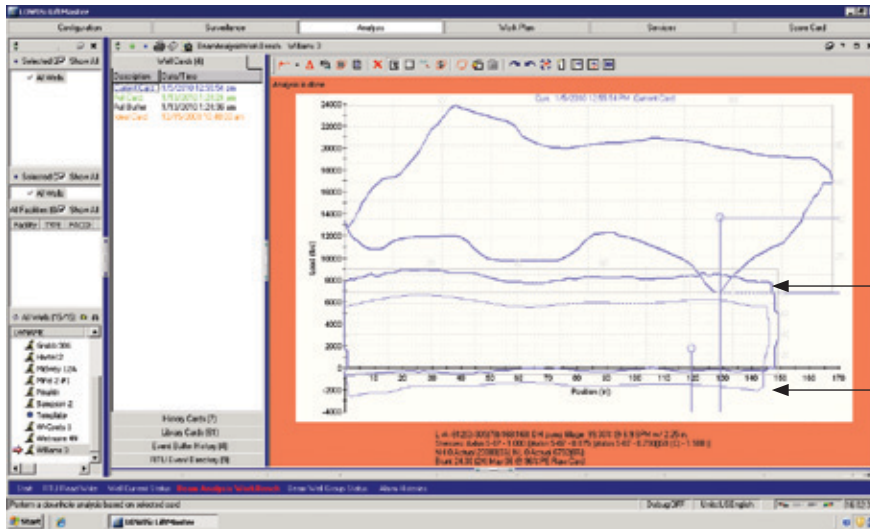


## How does it work?

The controller gathers data from the well through load and position sensors and uses it to calculate pump fillage and optimize production on each stroke. This information is used to minimize fluid pound by stopping or slowing down the pump at the assigned pump fillage setting. By using the unabbreviated application of the wave equation, the well can be controlled with unprecedented accuracy. That accuracy also enables real-time and historical production measurement for up to 120 days stored in the controller.

Getting started is easy. The new intuitive interface is easy to use and allows the user to quickly start optimizing the well.

<sup>1</sup>Everitt, T.A. and Jennings, J.W., SPE 18189, An Improved Finite-Difference Calculation of Downhole Dynamometer Cards for Sucker-Rod Pumps, February 1992.



The Everitt-Jennings card from the *WellPilot* controller lines up directly on the zero-axis line demonstrating “effective load.”

Abbreviated methodology from the “Gibbs” card must be adjusted manually for an accurate picture.

## Upgrade Capabilities

As your needs develop, the *WellPilot* controller grows. Because of the expandable design of the unit, it can be upgraded with additional features as you need them. Some of these features are:

- Real-time inputs from an infrared water-cut meter coupled with our daily fluid production measurement provides accurate and instantaneous production well testing
- Fluid-level measurements from a portable or permanent acoustic sounding device (ASD) provide real-time data which can be logged for pressure build-up analysis and real-time calibration for fluid-level control
- Real-time electronic flow measurements at the wellsite
- Measure and track chemical use and inventories in real time at the wellsite

## Packaging

The unit is packaged in a new custom red polycarbonate enclosure design that is virtually indestructible. An illuminated power switch externally mounted on the door means there is no need to open the panel to the electronics section to turn the *WellPilot* controller on or off. An easy-to-read enhanced graphics display and keypad makes it simple to setup, optimize, and troubleshoot your well.

Upgradeability—The *WellPilot* central processing unit (CPU) board can be installed in earlier versions of our Model 2000 and ePIC™ RPCs. The footprint of the board mounting locations and connectors make it very simple to upgrade to the latest technology and use the existing enclosure, display, radio and cables.





### Specifications

- One Ethernet port
- One USB port
- Three serial ports
- One CAN port
- One Bluetooth port
- Two analog inputs
- One analog output
- Two digital inputs
- Two relay outputs
- One turbine meter input
- One RTD input

### Connectivity

The *WellPilot* controller supports:

- Ethernet interface that can be used for remote flash firmware upgrades, debugging, or host interface using IP enabled radios
- Serial interface for radio communications to host management systems
- Expansion serial port for scanning external Modbus® devices
- USB on board for high speed connectivity and data storage
- Control area network (CAN) provided for future connection to infrared water-cut meter
- Bluetooth® provided for future connection to an acoustic sounding device
- SD memory card slot for upgrading operating system and applications in flash file system

### Getting Started

Since the *WellPilot* RPOC is an open system and both backward and forward compatible, you can implement it in existing automated fields. The unit uses standard load and position sensors and can even be retrofit into existing M2000 and ePIC™ controller housings. The RPOC can communicate across all standard communication channels so existing communication networks can be used.

The *WellPilot* controller simplifies the complex matter of optimizing the well and alleviates the difficulties in implementing a new system. Its open system and extendible design assure compatibility with current and future systems and applications. The menu system on the unit assures that the user can easily follow the steps to configure, run and troubleshoot the system.

Bluetooth and MODBUS are registered trademarks of their respective companies.



# Weatherford®

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