



Model 2000™ Rod Pump Controller

The *Model 2000* rod pump controller (RPC) from Weatherford is a cost-effective solution for wellhead control and production optimization. The *Model 2000* RPC intelligently controls well operation to maximize rod pump efficiency. It also minimizes forces on the sucker rods to optimize the life of the rod string, tubing, and pump.

The *Model 2000* RPC features field-expandable, input/output (I/O) capability that provides three options to allow the best match for individual wellsite applications. The automatic, beam-mounted, load-calibration feature allows the operator to simply enter the correct maximum and minimum loads in one step. The *Model 2000* RPC also supports an optional enhanced-graphic display and keypad, which increase ease-of-use through a menu-driven user interface.

The *Model 2000* RPC uses current microprocessor technology that also supports Weatherford's previous-generation 8800 products. The reliability and interoperability of the *Model 2000* RPC are ensured by leveraging the design criteria and field-proven hardware and firmware of the 8800-series products.



Features, Advantages and Benefits

- The unit provides the choice of continuous-position sensor or simulated position from a position switch to provide optimal well control.
- The *Model 2000* RPC supports the new portable enhanced-graphic display and keypad, as well as providing current well status information that can be viewed locally or remotely.
- The dynamometer card enables storage of real-time and historical data to evaluate current and historical pumping performance.
- Run-time history can be stored and plotted for 30 days, while cycle run-time is stored and plotted for the previous 17 pump cycles, providing important historical data.
- The valve check plot verifies the standing and traveling valve condition, confirming current operating conditions.
- The unit's setup menu is easily configured, reducing the chance of operator error.
- Peak and minimum polished-rod load data, stroke and cycle-based data logging allow operators to fine-tune pumping parameters based on well history.
- Alarm set-point and configuration features allow operators to easily configure set-points alerting them to a decline in pumping system performance.
- All parameters are compatible with 8500- and 8800-series controllers for optimal interchangeability and operational flexibility.

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Control

- Patented, air-balanced control automatically optimizes and controls air-cylinder pressure on air-balanced units.
- Peak energy control functionality inhibits well operation during peak periods of high energy costs, as determined by the operator.
- Motor restart protection prevents the motor from restarting when condensation is present on the motor-winding.
- Power-fail recovery method inhibits selected load alarms following a loss of power, allowing the well to pump down from a high fluid-level condition.
- Programmable (auto-acting) I/O provides unique monitoring and control applications, using analog, meter, and discrete inputs.
- Multiple control methods enable the operator to choose point or quadrant for lower-right or upper-left positions of the surface cards, as well as reverse pump-off.
- Automatic idle-time optimization provides improved determination of idle time, adjusted for inflow-based production.
- The pump-up delay timer eliminates an immediate pump-off condition resulting from incomplete pump fillage after well idle time.
- Monitor-only mode enables monitoring of dynamometer cards without regard for control set-points or speed ranges, making the unit ideal for generating a dynamometer card with a vector flux drive (VFD)-controlled pumping system.
- The unit works with all kinds of wells, allowing operators to standardize on one controller for multiple applications, such as heavy oil, sand, and deviated holes.

Analysis

- The unit provides calculations for gross fluid or inferred production, enabling accurate estimates of total fluid production from shallow and deep wells without complex wellsite configuration.
- The available operating mode for the electric submersible pump (ESP) enables the *Model 2000* RPC to monitor submersible pump controllers.
- System load analysis provides host-based detection of load-cell drift as downhole conditions change.
- Cycle and run-time buffers offer easy access to historical data at the wellsite or by using the host software.
- Dynamometer card buffers permit access to event cards, such as full and current shutdown, as well as several stored cards leading up to the event.



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System Configuration

- Simple menu for configuration, data management, system diagnostics, and load-cell calibration provides improved wellsite configuration.
- The unit's upgradeable hardware design enables auxiliary I/O, communications, and local user interface options to be added in the field.
- Three available options allow the best match for individual wellsite applications, permitting flexible, expandable I/O.
- The RPC's parameter structure enables compatibility with older RPC equipment.
- Basic three-level password protection provides security when accessing critical RPC setup parameters and well-control commands.
- The optional enhanced-graphic display with keypad provides a menu-driven user interface to configure and review system data, including dynamometer cards, valve checks, and run-times.
- The available exposed pad (EP) operating mode enables RPC interface with submersible pump controllers.
- The unit's local graphic display provides readily understood messages relating to pump system conditions.
- Digital rod-load calibration eliminates the need for manual adjustment of the potentiometers to calibrate the load sensor.
- The RPC's integrated, single-package design simplifies installation because all components are in one unit.
- Manufactured to strict standards, the unit's rugged design ensures long life and reduced cost of ownership.
- Sensor options, including position switch, continuous-position sensor, polished-rod load cell, and beam-mounted sensor, provide intelligent optimization of a wide range of well operations.

Options

- Fault lamp indicator
- Motor controller interface for 440 or 110/220 VAC
- External man-machine interface (MMI) connection
- Radio upgrade kits
- Handheld graphic display with keypad



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Specifications

Rod Pump Controller	
Enclosure	FCC part 15, subpart B, class A digital device
Approximate weight (lb/kg)	22 10
Input voltage range (VAC)	120/240
Frequency (Hz)	47 to 63
Relay output (VDC)	12
Operating temperature (°F/°C)	-40° to 185° -40° to 85°
Printed circuit boards	Conformally coated to protect against moisture, H ₂ S, and salt air
Communication protocol	Operator selectable, CAC 8500 native, ModBus™ RTU, or ModBus ASCII
Transient Protection	
Overvoltage/transient	Meets ANSI/IEEE C37.90.1-2989 protection specifications
Dynamometer card resolution	Samples and stores load and position data at 20 times per second for downhole analysis
Pump-off or reverse pump-off detections	Set-point or quadrant method
Analog-to-digital conversion	Monolithic, successive approximation 12-bit A/D converter
Polished Rod Load Cell	
Class	Quantitative strain gauge
Range (lb/kg)	0 to 30,000 or 0 to 50,000 0 to 13,608 or 0 to 22,680
Maximum error	±0.5%
Operating temperature (°F/°C)	-70° to 190° -56° to 88°
Certifications	FCC part 15, subpart B, class A digital device EU EMC directive 89/366/EEC CSA approved industrial control equipment motor controller miscellaneous

Expansion I/O Board

Board Number	Analog Inputs	Digital Inputs	Digital Outputs	Analog Outputs
1	2	2	2	0
2	4	4	4	0
3	8	4	4	0

*Can be configured as digital input (DI) or digital output (DO)

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