Weatherford®

WellPilot™ Variable Speed Drive for Rod Pumping

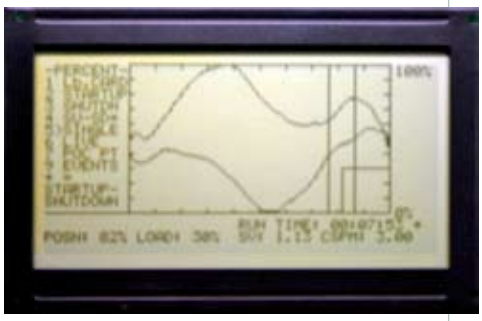
Continuous pump-fill control with speed and torque override for optimum management of rod-pumped wells.

WellPilot Controller Offers Optimum Management of Rod-Pumped Wells.

The critical challenge in rod-pumped wells is to match the pumping speed to the varying production capacity of the well, while protecting the system from mechanical damage. Conventional rod-pump controllers (RPCs) are effective in controlling the fluid level by cycling the well on and off, based on available fluid. However, in some cases, this process is not the best method of optimization. For instance, if a well is off for too long, the result can be inefficient operations or the pumps can stick due to sand content.

What is needed in the market today is a control system that can infinitely vary the speed while controlling polished rod torque throughout the speed range.

Weatherford meets this need with the *WellPilot* controller, which provides continuous pump-fill control with speed and torque override for optimum management of rod-pumped wells.



Interfaces

- Graphic keypad/display
- Serial communications–local/remote
- Portable keypad interface

Cost Savings

- Continuous operation eliminates inrush current and stuck pumps
- Adjustable pump fillage set points reduce rod pound

Weatherford's *WellPilot* controller uses an integral RPC in conjunction with precision speed-and-torque control to ensure that the well pumps only as fast as required. This method not only allows you to match the pumping speed to well conditions, but also supplies the required torque to operate when fully loaded. Precision torque control also means there is no need to oversize the drive relative to the motor for pump startup.

Drive reliability requires the proper enclosure to protect the sensitive electronics from foreign material as well as extreme temperature variations. The *WellPilot* controller uses an engineered package with through-hole mounting of the amplifier heat sink to reduce the heat and the overall size requirement of the cabinet.

Our NEMA Type 3R enclosure layout provides additional room for optional internal components while mechanical interlock enhances the safety of the package.

Features

- Minimizes mechanical stress on equipment
- Reduces power consumption
- Minimizes equipment wear
- Maximum torque from zero to base speed
- High-speed operation up to 120 Hz
- Controls low fluid level without pumpoff
- Reduces or eliminates rod pound
- Maximizes run times
- Flexible configuration
- Simple operation and setup
- Programmable restart function
- Package designed for all environmental conditions

Performance

- Adjustable speed eliminates need for sheave changes
- Auto restart after power loss or fault condition
- Overvoltage suppression software that eliminates the need for dynamic braking in most applications
- Auto-learn function that allows the controller to find the well's optimum speed settings
- Auto-speed control can adjust the pumping speed every stroke, based on pump fillage
- Low speed detection
- Simple setup decreases startup time
- Reliable operation
- Configurable menu allows easy access to critical information
- Graphic dynamometer display
- Built-in communication module
- Direct measurement of load and position for accurate determination of fluid level
- Inferred production algorithm for total fluid measurement with 30-day historical data storage
- Remote emergency shutdown (ESD) functionality

Dimensional Data

Enclosure Size	hp	Height (in./*cm*)	Width (in./*cm*)	Depth (in./*cm*)	Weight (lb/*kg*)
1	5 to 30	36 *91.44*	24 *60.96*	18 *45.72*	200 *90.72*
2	40 to 50	48 *121.92*	24 *60.96*	18 *45.72*	240 *108.86*
3	60 to 100	48 *121.92*	30 *76.2*	18 *45.72*	280 *127.0*
4	125 to 150	60 *152.4*	36 *91.44*	20 *50.8*	350 *158.76*

Data Protection

- Drive keypad can archive and store the critical drive parameters in the event you need to transfer the information to another drive or reload the values
- PC interface software allows you to transfer critical drive parameters to PC for storage and reference
- Multilevel password protection allows critical drive parameters to be accessible only with a password

Drive Protection

- Ground fault
- Motor phase-to-phase short circuit
- AC input overvoltage
- AC input undervoltage
- Instantaneous overcurrent
- Motor overload
- Heat sink over temperature
- Power transistor fault
- Logic power undervoltage
- Inlet and outlet phase loss protection
- Motor runaway
- Memory malfunction
- Processor running fault

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Specifications

Electrical	
Input Supply	
Three-phase voltage	230, 380, 480 VAC (±10%)
Three-phase frequency	50 to 60 Hz (±5%)
Single-phase voltage	230, 480 VAC (±10%)
Single-phase frequency	50 to 60 Hz (±5%)
Power Factor	
Overall	1.00 displacement power factor
	0.94 overall power factor at all speeds
Output Rating	
Voltage	0 to input voltage, three-phase
Frequency	0 to 120 Hz flux vector control
	0 to 300 Hz variable frequency control
Switching frequency	Programmable, 2 to 8 kHz varies with hp
Overload current	110 to 120% of rated for one minute (normal duty)
Conversion	
Rectifier unit	Six-diode, three-phase (six-pulse) full-wave bridge below 40 hp
	Diode-SCR, 6-phase (12-pulse) full-wave bridge for 40 hp and above
Inverter unit	Six-IGBT, four-quadrant, trap or sine wave output
Environmental	
Operating temperature (°F/°C)	-40 to 122 (*-40 to 40*)
Storage temperature (°F/°C)	-4 to 140 (*-20 to 60*)
Relative humidity	5% to 95%, noncondensing
Altitude	0 to 3,300 ft (*1,000 m*) at full rating
Inputs and Outputs	
Analog inputs	Size 12-bit analog inputs: 0 to 5 Vdc, 1 to 5 Vdc, or 4 to 20 mA
Analog outputs	Two 12-bit analog outputs (4 to 20 mA)
Pulse output	0 to 32 kHz
Digital inputs	Eight
Digital outputs	Eight
Serial communications	
MODBUS® port	8,500 protocol EIA RS232 and RS422/485, 1,200 to 19,200 baud MODBUS ASCII, MODBUS RTU
Enclosure	
UL listed package	Type 3R Engineered for all weather conditions Door interlocked breaker main disconnect Front mounted keypad and controls in secondary door Control transformer Panel mount enclosure (sizes one to three) Floor mount enclosure (size four)
Optional	
	24 Vdc power supply for external analog signals Communication (Ethernet) Line/load reactors IEEE-519 rated inlet harmonic package Long lead filter (DV/DT)

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