

Oil Well Pump Control System



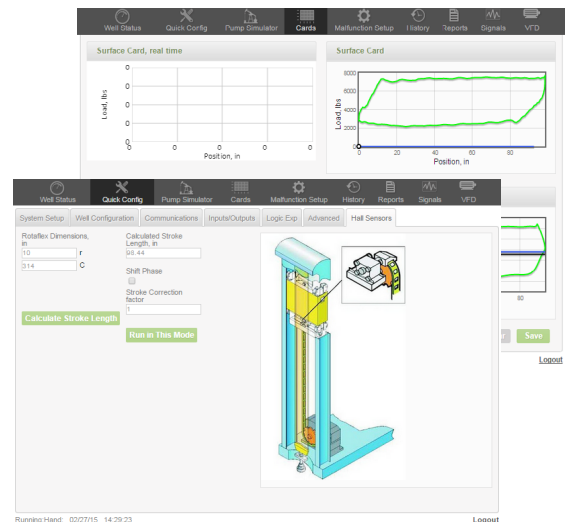
Overview

Modern approach to the automation processes in oil industry dictates stringent requirements for the hardware/software systems of control and management of downhole pump. The controller is designed for downhole pump real-time control. The data is processing and transferring to the operator console for storage and remote control of the controller.

Today the NI sbRIO is the user-friendly and reliable system. The controller allows connecting different types of analog and digital sensors. Data from these sensors are used for pump unit control and graphical data visualization on liquid crystal display (HMI) or remote computer screen. The software is developed by «Ovak Technologies» based on NI LabVIEW Developer Suite.

Features

- Mathematical modeling, animated display of real operation of the pump with downhole dynagraph and pump fillage calculation
- Calculation of the daily flow
- Drawing downhole and surface cards
- Different methods of measure position (various position sensors connection is possible)
- Real-time position estimation using geometry and crank sensor
- Programmable malfunctions and analog input channels (logical expressions, ladder logic)
- Dynamic leakage calculation and valve check
- Calculation of PIP
- Well control by pump fillage
- Equipment protection: max/min loads, malfunction set points, minimum fluid loads
- Support Modbus RTU protocol, available in XSPOC and other SCADA systems
- Archiving of well characteristics data
- Remote access to the controller with the web interface
- Wireless connection to the controller
- Single interface with Russian/English languages and metric/US units touch screen or personal computer



Technical Features of the System

Depending on modification (according to the configuration), the system interacts with:

- Touch screen (HMI)
- Variable frequency drive (VFD)
- Peripheral devices with RS-232, Modbus, Ethernet interfaces

Software

The software consists of operator's workstation software and controller software. Data exchange can be implemented with the wireless communication (FM, Wi-Fi) or Ethernet.

The controller can be set up with the following control modes:

- Automatic control of well operation by pump fillage and intake pressure
- Well operation control by timer and schedule
- Host mode operator or SCADA control
- Manual control mode
- Malfunction mode
- HTML based GUI to control well with mobile devices such as iPhone, iPad, Android tablets, etc.

