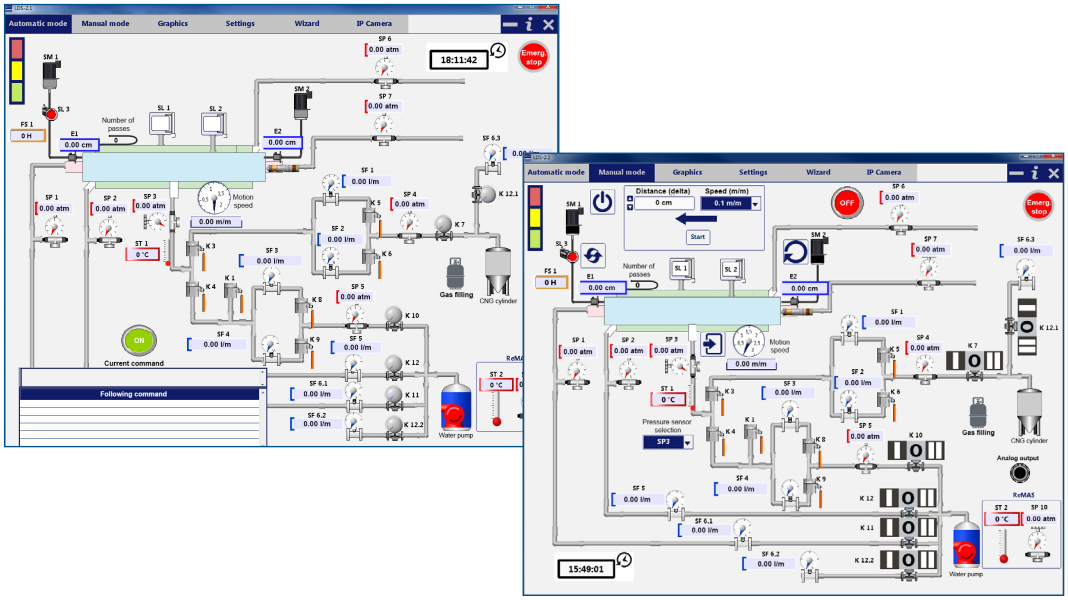
Stand Automation for Processes Simulation Occurring in Injection and Production Wells

Overview

The processes simulation stand automation system is intended to optimize of the experimentation in the automatic mode to study production and injection wells, as well as to reduce the labor intensity of experiments (implementation of the concept “One stand - one person“) and increase the accuracy of the plant operating parameters going on uphole of oil well.

The automation system is designed on the basis of the control and measurement equipment of National Instruments.

A special signal conditioning NTCB-01 connector block was developed which provides communication between the data acquisition boards and external devices.

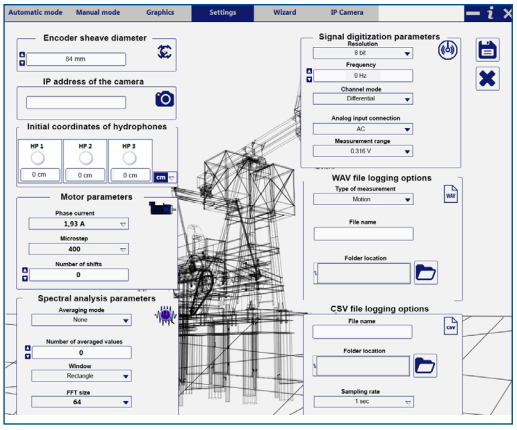


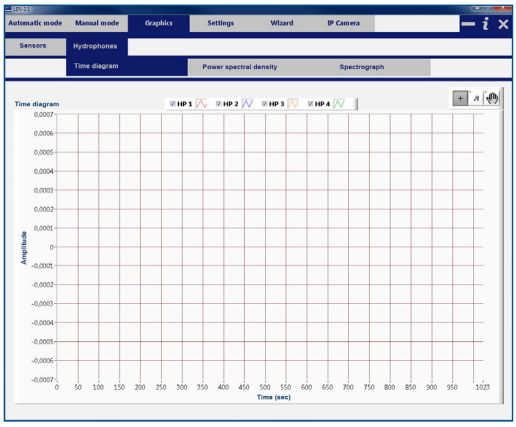
System Features

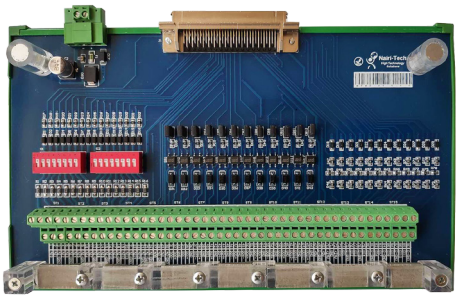
- Registration of acoustic signals which arise out during fluid movement through a porous medium and their recording in an audio file of the .wav format (with reference to the position of hydrophones within the experimental pipe of the stand)
- Setting the movement intervals of hydrophones within the experimental pipe and their station time
- Setting and maintenance of various pressure/flow modes
- Setting and maintenance of fluid injection modes
- Data acquisition from sensors and generation of control signals to the plant actuating mechanisms according to the given algorithm
- Automatic pressure release and activation of the alarm in the event of abnormal situations on the stand

Software Features

- Plant operation in automatic or manual mode
- Plant parameter setting as also algorithm of plant management
- Automatic control of the plant's actuating mechanisms according to the to the given control algorithm
- Generation of analog signals of various shapes and amplitudes
- Recording of sensors measured parameters to a data file with a specified sampling rate
- Record of acoustic signals from four analog channels and recording synchronization with the position of the hydrophones in the experimental pipe
- Measured parameters visualization in graphical and numerical form
- Automatic plant shutdown in the event of abnormal situations and alarm initiation







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