Industrial IT Solutions for Crude Oil Artificial Lift Applications

Creating value through integrated solutions

Maximize Your Return through Technological Innovation
ABB’s IndustrialIT for Oil Production is more valuable than the sum of our Products

As the world’s leading supplier to the oil and gas production industries ABB has provided you with power and automation systems, software and services to run your operation productively and profitably. You’ve thought of us as a measurement company, a controls company, an electrification company and an automation company. We’re all of those things. And all of those things combined are Information Technology, or IT. We focus IT on the core processes in your industry, blending the needs of the IT world with the needs of Industrial Automation. That’s ABB’s IndustrialIT.

ABB has designed complete IndustrialIT Artificial Lift solutions for Crude Oil Production to maximize your profitability and minimize your costs

ABB offers a complete range of power and automation solutions to operate, monitor and control your oil field. From down-hole sensors to SCADA, ABB’s IndustrialIT Pumping Artificial Lift Solutions (PALS) give your crude oil production facility a new competitive edge, with unsurpassed enterprise connectivity and information access.

ABB solutions are based on years of experience in artificial lift applications and in industrial control technologies. They improve the efficiency and reliability of your pumping operations and adapt to your ever-changing production needs, while protecting your current assets. ABB IndustrialIT PALS helps you create a seamless control and information infrastructure, for one oil well or hundreds.

A Total Suite of Well Controls for Oil Production

The automation needs of ABB’s customers vary from field to field, depending upon business and operational requirements and the layout of the field. So ABB designed our IndustrialIT Pumping Artificial Lift Solutions to be both flexible and scalable, to automate part or all of your oil production facility and to work with artificial lift pumps for crude oil production as well as multiphase pumps for oil movement.

IndustrialIT PALS features:
- Multiple language support
- Security and access control
- Intuitive configuration tools, available across system and application boundaries
- Seamless integration
- Network connectivity (communication with field and external systems, as well as enterprise-wide information systems)
- History and report capabilities
- Advanced, robust operator interface
- Optimization algorithms
Aspect Objects

A key feature of this next generation technology is ABB Aspect Objects™, which integrates information from a variety of applications and makes it available in real-time to any authorized users regardless of their location.

Artificial lift data and components are presented as configurable software objects. Each object carries a range of related information, for example, electrical and mechanical capabilities, intellectual properties and identity information that makes the object instantly recognizable to production-wide information networks.

With Aspect Objects, crude oil production information is deployed rapidly and uniformly, so that personnel throughout your enterprise view your business through the same real-time “window.” Better information means faster and better decision-making and more control over assets.

Services

ABB professional services range from providing electrical equipment, controls and instrumentation to delivering the most sophisticated automation systems. For a typical oil production facility, we offer:

- Project management
- Site survey
- Basic and detailed design
- Hardware and software engineering
- Installation and commissioning
- Start-up assistance and training
- Service and maintenance during the entire system life cycle

ABB services, consulting and training are an integral part of the project, including planning, design, production and start-up assistance. ABB’s support doesn’t end with commissioning: online and on site support is an important part of our program for both manned and unmanned terminals.
IndustrialIT Smart Power House (SPH) is the easiest and most consistent way to build up, install, commission, operate, integrate and optimize your production:

- Well Pad Automation SPH for clusters using progressive cavity pumps (PCPs), electro-submersible pumps (ESPs), rod pumps (RPs) or any combination of the three
- Multiphase Pump Automation SPH for multiphase pumps, auxiliaries and valves

The SPH contains all the automation equipment related to the well, plus software suites to drive operations in a controlled environment:

- Skid, surface and down-hole instrumentation
- Motors
- Control, supervisory and communication systems
- DriveIT Variable Speed Drives
- OptimizeIT Optimal Pumping System (OPS)
- Power quality control and voltage distribution

These products and systems are modular; you choose the combination you need. The complete configuration is then housed in a shelter for multiple wells or in an outdoor cabinet for stand-alone wells. The SPH shelter features a controlled environment with thermally insulated roof, walls and floor. It comes with transit frames/filler blocks for all cables; emergency lights, luminaries and AC outlets; fire and smoke detection and alarm system; and fire extinguishers.

IndustrialIT for Well Pad Automation SPH

The biggest challenges for a well pad automation system are to keep the wells running under variable reservoir conditions; prolong the life of the pumping equipment; and make sure data moves quickly from the well to the main operation station, to avoid lost production time.

ABB's Well Pad Automation SPH contains controller and variable speed drive software for various types of pumps. It interfaces with ABB's OptimizeIT Optimal Pumping System and DriveIT Variable Speed Drive, to provide the most efficient, complete and powerful platform for oil well production.

This SPH:

- Includes ABB DriveIT variable speed drives according to the power requirements of the application
- Offers a lifting methodology that’s software dependent, and adaptable to rod pump, progressive cavity pump or electro-submersible pump
- Interfaces several brands of down-hole sensors (DHS)
- Interfaces surface instrumentation
- Provides historical data handling and reports for each well
- Provides communications with external systems and field buses
**IndustrialIT for Multiphase Pump Automation SPH**

When the field operation requires the use of multiphase pumps, ABB’s Multiphase Pump Automation SPH controls and optimizes the pump operations, and integrates fully to skid instrumentation and subsystems.

This SPH includes:
- DriveIT Variable Speed Drive sized according to motor and pump characteristics
- A dual bus bar so that both 400 KVA and 1760 KVA units can fit in the same sized SPH
- Power distribution and Uninterruptible Power Supply (UPS) according to the power requirements of the application
- A motor control center for up to 12 auxiliary motors
- OptimizeIT Optimal Pumping System with input/output modules for analog, digital and temperature signals
- MMI color operator interface with touch screen
- Vibration monitoring system
- MPP Skid Maker
- Active filter for production optimization (optional)

**OptimizeIT Optimal Pumping System**

The Optimal Pumping System (OPS) is an integrated optimization, control and communications system for any artificial lift method based on down-hold pumping. Whatever artificial lift method you use rod pumps, progressive cavity pumps, electro-submersible pumps or multiphase pumps the OPS:
- Controls the well's operations and emergency shutdown system, integrates subsystems and field devices, and records and reports historical data
- Keeps communications flowing to and from the main station, and to and from the pumps, with integrated voice and data equipment

**DriveIT Variable Speed Drive**

Whether you’re focusing on one single well or a cluster of wells, ABB lets you build up an oil field automation system unit by unit. ABB supplies stand-alone DriveIT variable speed drives for any artificial lift method. The ALC600 and ACS600 Oil Artificial Lift Controller handle wells with a wide variety of characteristics, such as temperature, pressure, production rate and API grade of the oil.

**SPH for Power Distribution**

SPH meets your power distribution needs by providing:
- Control over incoming power at any power distribution voltage
- Outdoor cabinet including fuse disconnect switch
- Step down transformer according to power supply requirements
- Electrical protection for all pump loads (progressive cavity and multiphase pumps)
- Active filter (optional) and battery charger

**SPH for Power Quality**

Harmonics generated by power switching components create a relevant problem for electrical power distribution. ABB uses harmonics filters to reduce and control harmonics and make your operation more efficient and reliable. Even the largest sized active filters can be placed within the SPH.
All the control strategies required to operate the different pumps in your field reside in the Smart Power House as part of the Optimal Pumping System (OPS) software and the Drive™ Variable Speed Drive.

**For Progressive Cavity Pumps (PCP)**
- High/low torque control
- Back spin control
- Intake pressure control
- Annulus pressure supervision
- Nomographic behavior
- Intake-discharge differential pressure control
- Intake-annulus differential pressure control
- Supervision and protection by flow pressure
- Discharge pressure supervision

**For Rod Pumps**
- Speed reference in strokes per minute
- Actual speed in strokes per minute
- High torque control
- Down-hole pressure control
- Rod floating control
- Production optimization
- Speedup control
- Sensor based or inferential Dina-graph chart generation

**For Electro-Submersible Pump (ESP)**
- Annulus pressure supervision
- Supervision and protection by well production pressure
- Intake pressure control
- Speed control according to intake temperature
- Intake-discharge differential pressure control

**For Multiphase Pumps (MPP)**
- Intake pressure control
- Subsystems control
- Diluent control
- Protection
- Motor control center (MCC)
- Process data history log
ABB Portfolio

The ABB portfolio of Pumping Artificial Lift Solutions ranges from instrumentation through power and drives to collaborative commerce solutions, and from standard monitoring and control strategies to dedicated technologies for wells and well-related operations.

Integrated solutions for oil production

ABB's Industrial™ solution integrates well production, well pad automation and power systems, and links directly to enterprise-wide information systems.

OperateIT SCADA Vision for Oil & Gas

ABB is able to provide an integrated solution covering all your production requirements, with our power, control and instrumentation products and application expertise. Once you have automated your well pad or an entire oil field, we can help you advance toward the next step in integrated operations by linking downstream operations with a SCADA or telecommunication system.

Power technology

As the world’s leading supplier of power technology products, ABB delivers solutions, systems and equipment to efficiently transmit, distribute and control power. We combine an extensive line of hardware with expertise in network management, control, protection and monitoring and with consulting and diagnostic capabilities.
Industrial™

The Next Way of Thinking

Industrial™ solutions from ABB blend the industry's broadest portfolio of industry knowledge and products with a proven architecture for real-time enterprise automation and information.

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