

Industrial^{IT} Solutions for Enhanced Onshore Oil and Gas Operations

Creating value through integrated solutions



ABB's Industrial^{IT} is more valuable than the sum of our Products

As the world's leading supplier to the upstream oil and gas industries, ABB has provided you with equipment, automation systems, software and services to run your operation productively and profitably. You've thought of us as a power company, a measurement 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 Industrial^{IT}. ABB's philosophy is to add value from the ground up and within every individual product. We ensure "Absolute Value," emphasizing "Lowest Installed Cost" and / or "Lowest Cost of Ownership," so that you enjoy lower operating costs and increased revenues throughout your enterprise. This is our goal.

ABB custom-builds complete Industrial^{IT} solutions for the oil and gas industry to maximize your profitability and minimize your costs

ABB offers total solutions for oil field operations to optimize and monitor oil and gas wells, oil batteries and plants in real time across your business; eliminate losses; and meet strict government regulations. From the wellhead to the SCADA

control room, and on to the boardroom, ABB's Industrial^{IT} gives your oil and gas production business a new competitive edge, with unsurpassed enterprise connectivity and information access.

Aspect Objects

A key feature of this next generation technology is ABB Aspect ObjectsTM, which integrates information from a variety of applications and makes it available in real-time to any authorized users regardless of their location. Oil field data and oil field 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 enterprise-wide information networks. With Aspect Objects, pipeline 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.

Industrial^{IT}
enabled

Services

Much of the lifetime return on your investment is determined from the moment you break ground on a new project. ABB can help by providing services, consultation and training as an integral part of the project throughout its life-cycle, including planning, design, production and start-up. Our support doesn't end with commissioning; online and onsite support are also part of our program.

For a typical onshore oil and gas industry project, we offer:

- Project management
- Site survey and analysis of existing facilities for asset and production optimization
- Basic and detailed design
- Hardware and software engineering
- Procurement and logistics
- Installation and commissioning
- Startup assistance and training
- Service and maintenance



Onshore Petroleum Production Automation Solutions

ABB offers a complete line of products, devices and technologies for oil and gas field automation, including:

- Field interfaces and transmitters
- Remote terminal units (RTU's)
- Programmable Logic Controllers (PLCs)
- Electronic Flow Measurement (EFM)
- Variable Frequency Drives (VFD) and VFD based Artificial Lift Controllers (ALC600)
- Power equipment
- Automated measuring systems (AMS)
- Communications equipment
- SCADA Host
- Production and Optimization Applications
- Integration Solutions

ABB addresses all your automation needs, from the wellhead to the control room to the Web. We can incorporate your existing sensors and transmitters as well as your existing intelligent electronic devices (RTU's, EFM's, PLCs , VFD's) into a single automation system.

We've designed our solutions within a software framework that integrates device-level control, business procedures, human/machine interfaces for drivers,

operators, engineers and management and information storage and retrieval across your enterprise.

- Scalability - A components-based architecture permits both functional and geographical distribution. Most small to medium oil and gas fields can be run from a single server, while large fields can be hosted by two or more computers.
- Availability - We offer fault tolerant solutions with automatic fail-over through hot standby units.
- Security - Our highly configurable authority system prevents unauthorized persons from gaining access and activating commands.
- Openness - Open communication with system components is established through standards such as Object Linking and Embedding Database (OLEDB), Open Database Connectivity (ODBC), Component Object Model (COM), Active-X, Visual Basic (VB), Object Linking and Embedding (OLE) and OLE for Process Control (OPC). These state-of-the-art features are offered along with sophisticated front-end communications with redundant configurations and automatic switchover in case of lost communications with remote devices.





Operate™ SCADA Vision

Supervisory control and data acquisition (SCADA) systems improve the use of upstream oil and gas assets. The result is faster turnaround with increased functionality. Oil and gas products are moved from the point of production to the point of consumption in the shortest possible time and at the lowest possible cost. The Industrial™ solutions from ABB are designed to fulfill this objective while keeping overhead as low as possible.

Scalability and Openness

All Industrial™ solutions offer scalability and openness, from single-node installations to multi-server systems. Moreover, the solutions are implemented upon an object-oriented system based on true client/server principles and with a redundancy (hot-standby) concept. Security is offered through a highly configurable authority system that prevents unauthorized persons from gaining access and activating commands. The open communication standard permits connections with data analysis and optimization tools from third party vendors. Thus, Industrial™ SCADA products and technologies communicate not only with ABB RTUs but also with RTUs from other vendors, using protocols like Modbus (Fisher ROC, SCADA Pack, Bristol 3300, Daniels), Allen Bradley DF1/DH+, Barton Adept, HP68000 and Bristol BSAP.

Features of Operate™ SCADA Vision

- Offers a network-accessible, object-oriented, relational non-proprietary database.
- High Performance real time database incorporates relational and object-oriented characteristics while providing open SQL (Structured Query Language) access. This enables many users to access the SCADA system without affecting field data acquisition and control function.
- Client HMI access to SCADA data over low bandwidth networks using Publish and Subscribe technology. This feature provides a functional client HMI to the operators in remote locations using a dial-up/radio connection.
- A polling engine that is capable of collecting data from multiple device types and from automation systems produced by other vendors; the DVI (polling engine) can poll multiple devices with different protocols at the same time through one serial port. This feature enables the SCADA system to collect data from many different RTUs during one scanning cycle.
- A simple graphical design environment based on Microsoft Visual Basic; no user programming is required to create fully featured front-ends for operations.

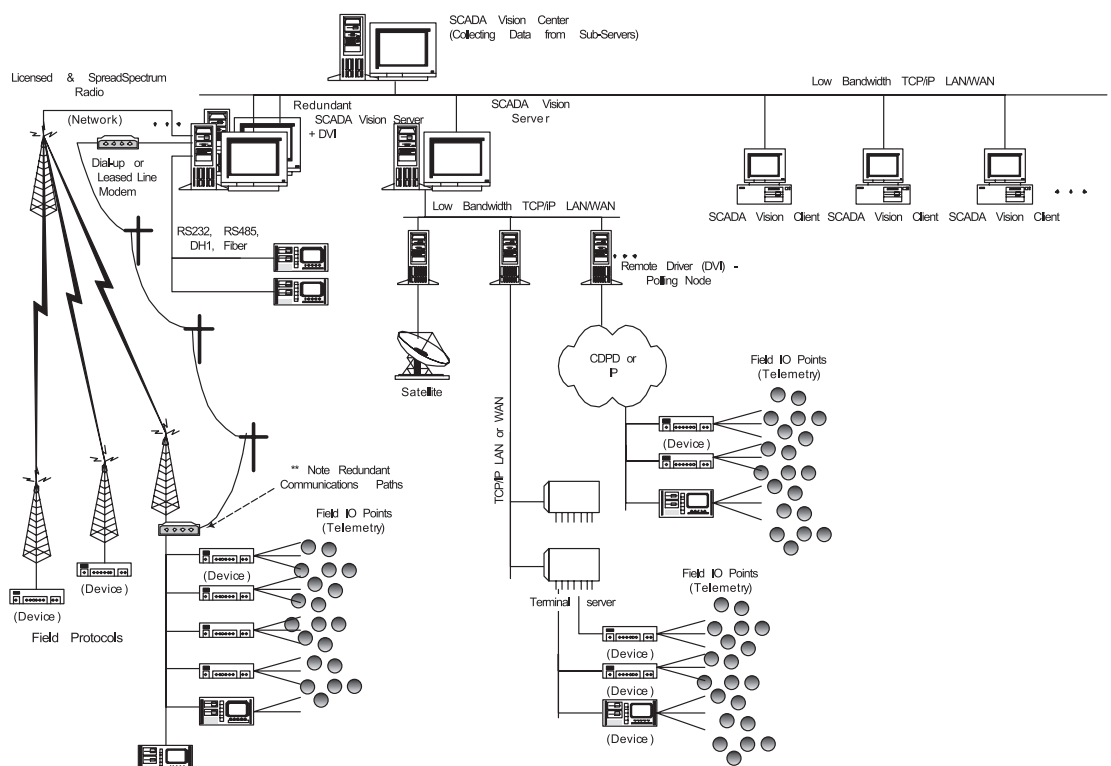


Operate™ SCADA Vision

- Ability to interface to EFMs beyond simple polling of real-time/"end of day" values; this includes managing history records from the EFM, with storage/manipulation of EFM data according to API21.1 standard.
- A Windows Explorer-type interface to provide global access to SCADA Vision systems
- Multiple alarm states (more than 50), which provide advanced diagnostic information, so you can fully monitor the process and avoid costly downtimes.
- Real-time server redundancy, allowing the system to run with an active/standby configuration.
- Multiple communication routes for networks and devices (RTUs, PLCs, etc.); when the system detects route failures, it automatically switches the network or device to another available communication route.
- Ability to handle a large database with unlimited client stations.
- Business Object Templates (BOT) for configuring large amounts of similar devices (RTUs, EFMs, etc.) in a very short time. This feature saves upfront engineering costs. With a few mouse clicks, you can add and delete devices after the system is commissioned, for a huge savings in operation and maintenance costs.
- Plug-in production and optimization applications, designed for the oil and gas industry.

Seamless Information Flow

ABB's Operate™ SCADA Vision solutions seamlessly link to your business and trading systems in real-time, creating a single source for operational, engineering and business information, in other words, and a total enterprise solution. With this approach, you can coordinate and optimize your operations, and integrate them with the rest of your business, a true competitive advantage.

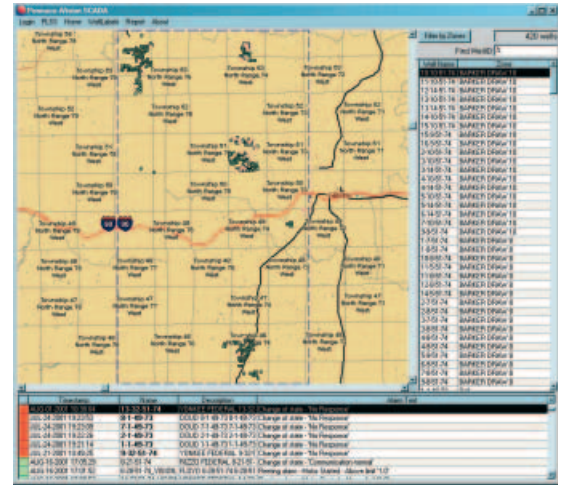


Notes

Operate^{IT} SCADA Vision Value Proposition

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- Reduction in maintenance costs:
 - SCADA system is open, flexible and scalable for current and future requirements.
 - Inherent template feature allows expansion of the system without expert assistance.
- Reduction in production costs:
 - Enables visit-by-exception to wells and facilities. This improves the ratio of operators per well as field expands and reduces travel costs.
 - Better control of field operations and access to real time information allows effective decisions for field management.
- Increase in production volume:
 - Real time monitoring allows immediate reaction to equipment faults leading to reduce downtime.
 - Implementation of production and optimization applications on SCADA system.
- Enhanced decision making capability across the enterprise:
 - Links to enterprise resource planning (ERP) systems.
 - Helps to concentrate and organizes data into knowledge.
 - Provides comprehensive data reporting to production, operations, maintenance, engineering, accounting and management
 - Enables change in work practices.
- Improves personnel safety:
 - Awareness of existing site hazards, reduced travel and hazardous site time.



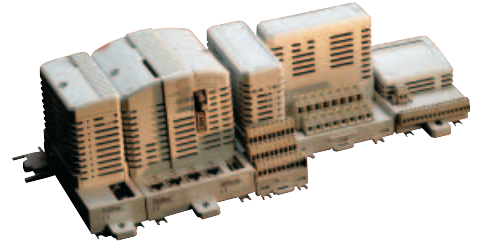
- Allows control room to handle emergency responses.
- Proactive corrective action based on abnormal situation detection.
- Improves Environmental protection:
 - Real time monitoring ensures faster response to environmental issues.

Operate^{IT} SCADA Vision is based on Open standards and has been designed for the onshore oil and gas and transportation market. Operate^{IT} SCADA Vision system offers flexibility and scalability, which reduces life-cycle costs while the simplicity of the system results in lower system support costs. The system also offers various value-added oil and gas applications integrated with the system, which enables users to reduce operational costs.



Meter™ Automated Meter Systems (AMS) Libraries

Industrial™ control solutions perform multi-tube flow compensation calculations. Meter™ AMS libraries include gas flow calculations such as AGA 8 super compressibility calculations, AGA 5 energy volume, AGA 3 gas orifice (1985,92) and AGA 7 gas turbines. Liquid flow calculations include API equations applied to liquid orifice and turbines for various densities. The Meter™ AMS solution offers multi stream capability and is implemented on standardized ABB Control™ hardware. These features reduce the implementation costs, minimizes plant training, reduces hardware spares and capital costs for the customer.



The Meter™ solution delivers higher value to users by including the integration of flow values into advanced control, production management applications and Industrial™ solutions.

Solutions for Pipelines

ABB's products, devices and technologies for oil and gas pipeline automation encompass block valve stations, pump stations and tank farms in liquid applications as well as compressing, reducing and metering stations in gas applications. For transporting and distributing crude, fuel, gas and petrochemical products, the Industrial™ solutions include:

- Compressor, pump, pump group, valve and set point control
- Tank, flow, temperature, pressure and quality measurement
- Scraper/Pig launch and catch automation
- Operation shutdown function
- Leak detection by pressure analysis
- Energy management



Advanced Production and Optimization Applications

ABB Industrial^{IT} SCADA technology offers an open environment to efficiently integrate ABB and third-party applications. SCADA integrates seamlessly with ABB Drive^{IT} solutions for optimizing rod pumps, progressive cavity pumps (PCP) and electric submersible pumps (ESP).



ABB provides many advanced production and optimization applications for integration with SCADA, including:

- GAS database - API 21.1 audit trail
- POC dynacard
- POC interrogation and history
- Compressor performance tracking
- Well test automation
- ESP/PCP pump control and protection
- Automated pig launching
- T&C production automation
- Plunger lift control
- Nomination control
- Alarm management and cry out



Field^{IT}

Optimizing your investment

Our broad ranging instrumentation portfolio - unrivaled in its scope - provides the widest choice of fieldbus enabled instrumentation. With the ability to integrate fully into Industrial^{IT}, instrumentation from ABB gives an opportunity for a complete, expandable solution - from scaleable systems to complete asset optimization.

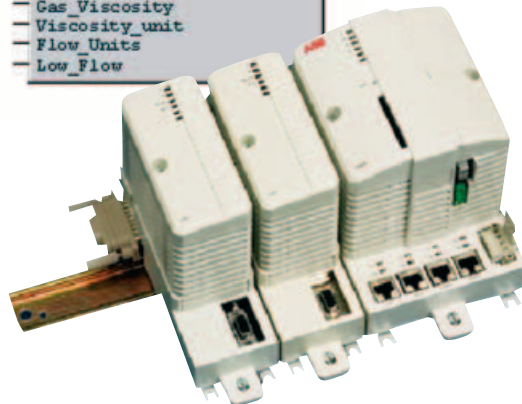
Available now, ABB fieldbus enabled instrumentation and systems allow you the freedom to select not only the most suitable instrumentation solution but also the most appropriate system for your application - including FOUNDATION fieldbus, PROFIBUS and HART.

Field^{IT}, helping you make the right choices.

Remote Terminal Units

ABB has RTUs to suit any application, with small, medium or large-sized data point volumes (for instance, block valve stations, scraper stations or city gates with pressure reduction and metering). ABB RTUs provide redundancy in CPU, remote communication and power supply, they are available as high speed counter interfaces for turbine meters, and they can monitor local pressure drops to detect pipeline leaks. Our smart RTUs combine a high performance RTU with a library of field-proven algorithms (for example, flow computer applications) in one controller. They perform multi-tube flow compensation calculations such as AGA 8 super compressibility calculations, AGA 5 energy volume, AGA 3 gas orifice (1985,92) and AGA 7 gas turbines. Liquid flow calculations include API equations applied to liquid orifice and turbines for various densities. Other standard calculations, like NX-19 are also available.

AGA3	
AGA3	
T_flow	densitybase
P_flow	densityflow
Z_flow	Ev
dp	Yl
T_base	Reynolds
P_base	Cd
Z_base	qm
P_atm	qv
SG	Q
T_ref	Revision
T_Unit	Error_Code
P_Unit	
dP_Unit	
Orifice_Size	
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Ori_Pipe_Unit	
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Control[™] X Series Remote Controllers from ABB combine unmatched measurement technology with next-generation remote controller technology to optimize your facilities - and your time. More I/O options keep you connected, giving you the flexibility to control and monitor for maximized efficiency. Upgradeable and extendable architecture expands with your needs. With spacious cable routing, large enclosures and powerful battery capacity, we've anticipated your need to grow. XRC Remote Controllers combine the best of both worlds: accurate measurement with state-of-the-art remote control capabilities.

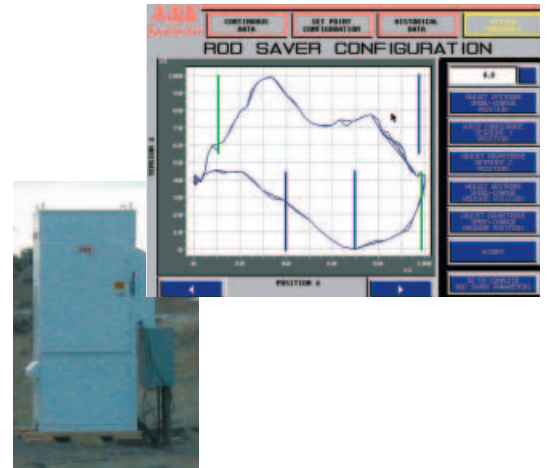
For simple, affordable chart replacement technology that grows with your system, Meter[™] X Series Flow Computers from ABB deliver proven accuracy with the individual fit of a customized system. Through years of applications-driven experience, we've built greater efficiency into every function. Easier installation, less frequent calibration and streamlined, accurate custody transfer systems are just the beginning. Electronic baseboards increase stability, computing power and reliability. X Series products work with your existing equipment to increase efficiency while saving costs, and I/O modules are extendable and easy to upgrade.





Remote Terminal Units

For oil and gas pumping applications, ABB offers Drive^{IT} ALC 600 variable frequency drive based Artificial Lift Controllers. ALC 600 offers standard hardware and application specific software designed to withstand the rigorous conditions and challenges that are inherent to the oil industry. The ALC 600 Artificial Lift Controllers for ESP, PCP and Rod Pump applications has built in data logging capability that allows the operator to access critical well information either locally or via the SCADA Vision system i.e. the ALC 600 can act as a RTU to transfer information from the well head directly to the SCADA system.



Telecommunication

A total Suite of Telecommunication Solutions

ABB's solutions are based on the leading industrial telecommunication technologies, for simple, reliable and secure operation throughout your facility's lifetime. These systems adapt to your changing needs, protecting your investments. ABB designs each telecom system for integration with other telecom, SCADA and automation systems. This enables you to build seamless common control and information infrastructures.

Applications

- Internet and virtual private networks
- Licensed and spread spectrum radio
- Microwave radio and leased lines
- Cellular and cellular digital packet data (CDPD)
- LAN/WAN
- Satellite





Motors and Drives

World's Leading Drives and Motors

ABB is the pioneer in digital AC motor speed control for the oil and gas industries. Our dependable single-drive and multi-drive systems address a variety of oil and gas applications, including Rod pump, PCP's, ESP's and MPP (Multi Phase Pumps). Variable speed drives help reduce energy consumption while they enhance system versatility and user-friendliness.



Features

- Embedded algorithms to optimize Rod pump, PCP, ESP and MPP operation
- Environmentally packaged drives for direct installation in oil fields
- OPS - Optimal Pumping System to control and protect MPP, ESP, PCP and Rod pumps.
- Less equipment and fewer moving electrical components
- Efficient energy usage



Power Technology

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

SPH - Smart Power House

- Equipped power and control room
- Harmonic filters included
- One communications infrastructure for a group of wells

High-Voltage Technology

- Breakers and modules
- Cables
- Gas insulated switchgear
- High-current systems
- High-voltage components
- Power line components

Medium-Voltage Technology

- Apparatus
- Switchgear
- Modular systems

Power Transformers

- Power transformers
- Shunt reactors
- Industrial transformers
- Traction transformers
- Transformer components
- Repair and service

Distribution Transformers

- Oil type
- Dry type
- Special applications

Low-Voltage Technology

- Apparatus
- Switchgear
- Modular systems

Industrial^{IT}

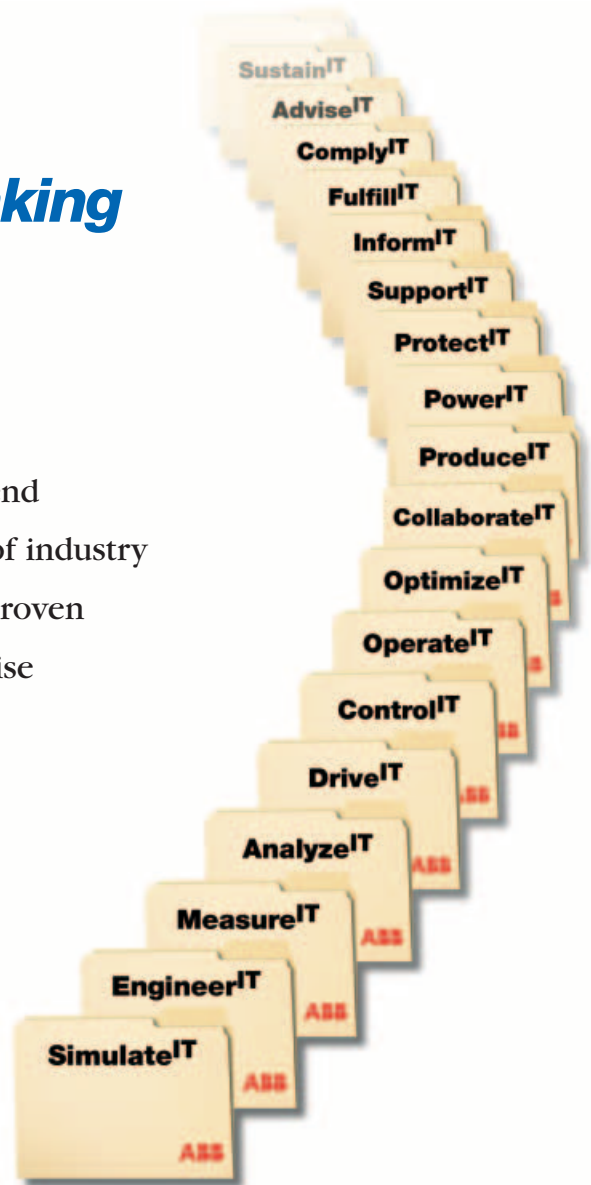
The Next Way of Thinking

Industrial^{IT} 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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