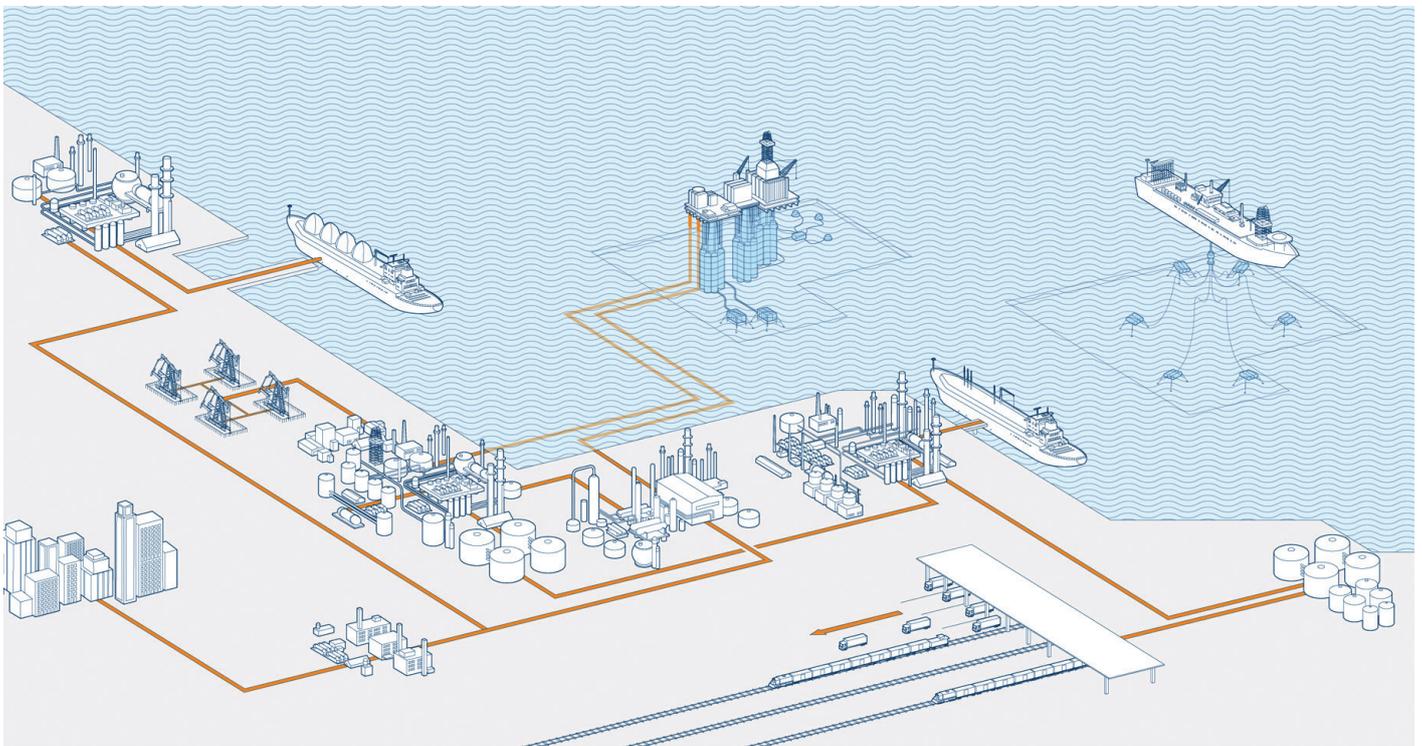


Instrumentation for oil and gas

Complete solutions to single products



Complete instrumentation solutions for the oil and gas industry

ABB is a leading supplier of measurement products and complete instrumentation solutions for the global oil, gas and petrochemical industries.

We offer a comprehensive portfolio of products and solutions – from EICT and MIV projects where we act as the main instrumentation vendor, to smaller projects where we provide specialist solutions or individual measurement products.

Our scope of supply extends along the entire project chain – from front end engineering and design studies to interface engineering, project execution and documentation, and life cycle service.

ABB has more than 100 years of measurement experience. We have one of the largest instrumentation product portfolios on the market and a heritage that includes some of the biggest and most trusted brands in the industry. We also have a long and distinguished track record in the oil and gas industry as a supplier of integrated electrical and control solutions, telecommunications systems and specialist EPC projects.

From our global competence center for oil and gas instrumentation in Denmark, we provide unrivaled solutions and expertise for onshore and offshore projects worldwide.

From complete solutions to single products

Our offering covers the entire spectrum of instrumentation products and oil and gas applications.



We offer complete instrumentation solutions for projects in which we act as the main instrumentation vendor (MIV) or as the instrumentation provider of a larger ABB electrical, instrumentation, control and telecommunications (EICT) contract. These solutions comprise both ABB and third-party products. We also provide innovative solutions for specialist applications such as metering, gas analysis, wireless instrumentation, and high integrity pressure protection systems (HIPPS). And, we offer instrumentation devices – as single items or as product packages - from ABB's vast portfolio of state-of-the-art measurement products.

Our products and solutions are used by all the leading oil and gas companies and in all offshore and onshore applications – from subsea to topside, from the pipeline to the refinery and petrochemical plant.

From FEED to commissioning

ABB covers the entire delivery chain in instrumentation projects large and small.

For large-scale EICT and MIV projects we act as a one-stop shopping point for instrumentation. We bring our expertise to the front end engineering and design (FEED) studies phase and perform interface engineering between vendors' instruments and the process control system. We provide complete documentation packages for the installation process and the end customer, and we create predictive maintenance strategies to ensure the lowest cost of ownership over the solution's life cycle.

Large-scale projects contain highly specialized applications like gas analysis and wireless instrumentation. These require specialist engineering skills and are an ABB specialty. We provide complete solutions for these applications – from feasibility studies to design, procurement, commissioning and service.

On the product side, ABB has one of the most comprehensive instrumentation portfolios on the market. It encompasses the entire range of measurement applications – flow, temperature, pressure, analytical, level and valve automation. We provide single products or product packages for these applications.

From predictive maintenance to life cycle management

ABB is one of the largest automation and automation service companies in the world. Our instrumentation service specialists are strategically located to support our customers globally. Our broad service offering ensures that we can offer support across the entire life cycle of our instrumentation products and solutions. Diagnostic features that enable predictive maintenance and integrated operations are a key differentiator of ABB instruments.

Our service offering for instrumentation includes:

- Engineering and consulting
- Maintenance
- Service agreements
- Training
- Installation and commissioning
- Repairs
- Spare parts and consumables

Global competence center

ABB's Global Competence Center for Oil and Gas Instrumentation is located in Esbjerg, Denmark – the capital of Denmark's offshore energy sector. From here we serve offshore oil and gas instrumentation projects all over the world. We have more than 50 dedicated instrumentation engineers at the center, each of whom has on average more than 15 years' experience at the cutting edge of oil and gas instrumentation.

Electrical, instrumentation, control and telecommunications

ABB has delivered electrical, instrumentation, control and telecommunications (EICT) solutions for oil, gas and petrochemical projects all over the world. Seamless integration and flawless execution are the hallmarks of our EICT solutions. They reduce capital and operating expenditure by as much as 20 percent and cut project delivery times by up to 3 months.

Seamless integration and flawless execution

When ABB wins an EICT contract, our role is to deliver the complete instrumentation scope of the overall ABB solution. We take part in the front end engineering and design studies phase, create a solution of standardized ABB and third-party measurement devices, perform the interface engineering between the vendors' equipment and the process automation system, and prepare complete documentation for installation and the end customer. And, we ensure that each device has diagnostic features to enable predictive maintenance and instrument reliability for the end customer.

Project benefits (greenfield)

- Reduced CAPEX (~20%)
- Single point of responsibility reduces risk
- Faster project start-ups
- Reduced engineering
- Reuse of knowledge and solutions
- Standardized products
- Diagnostic features for predictive maintenance

Operational benefits

- Reduced total cost of ownership (~20%)
- Increased production thanks to integrated operations and predictive maintenance
- Improved operator efficiency/productivity
- Increased safety
- Reduced life cycle costs (training, spare parts, personnel, maintenance)
- Single point of contact for maintenance

Project profile: Goliat FPSO, Barents Sea

Customer: Eni

Scope of supply: EICT

Completion: 2014

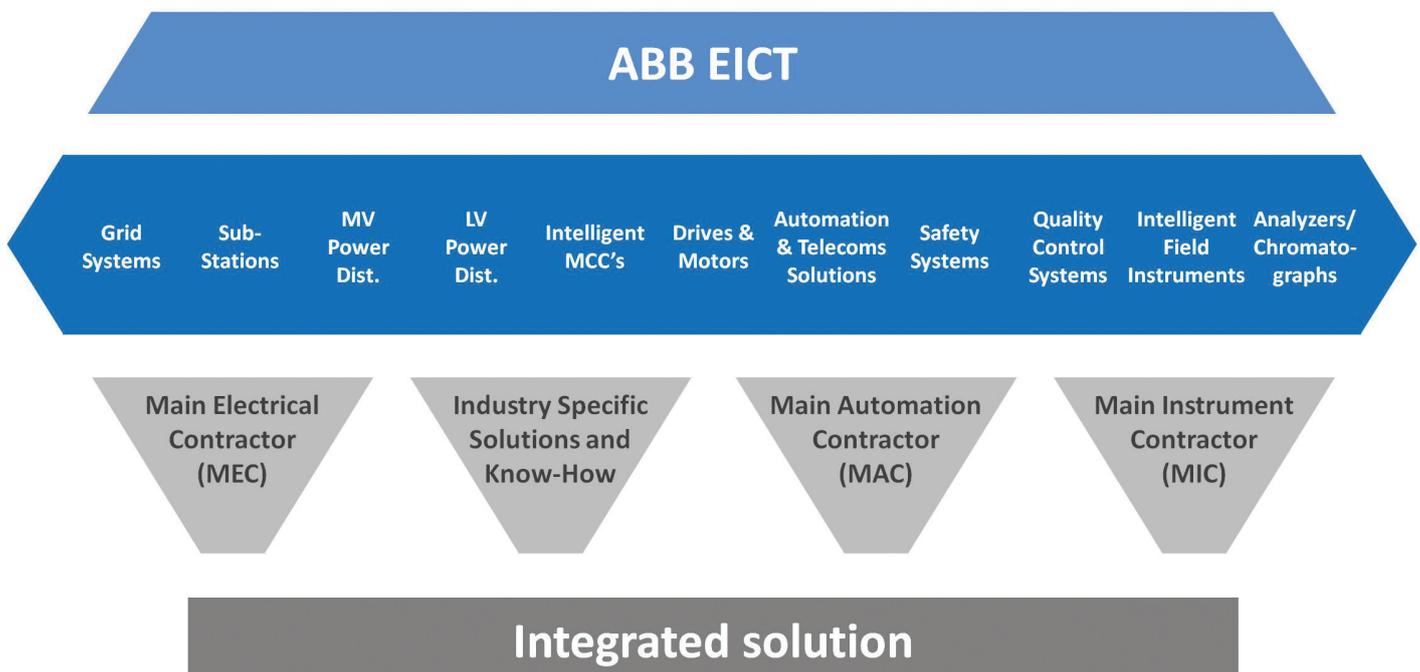
Goliat is a pioneering project in the oil and gas industry. Located within the Arctic Circle, it is the first oil and gas project ever in the Barents Sea.

Production will take place from the Goliat FPSO – a truly state-of-the-art platform that is designed to meet the challenging conditions and strict environmental requirements for operation in the Barents Sea.

The platform is highly automated and highly integrated to ensure safety, reliability and minimal greenhouse gas emissions. This requires integration of platform systems - electrical, safety, telecommunications, etc – with the process control system, as well as large-scale data collection and diagnostic features in the instrumentation. The platform control system has the capability to be remotely operated from an onshore control center.

Eni required not just an EICT contractor but a technology partner. The ABB instrumentation solution comprises around 4,500 ABB and third-party instruments and detectors, which were selected for their ability to meet Goliat's challenging operating requirements.

ABB is also responsible for instrumentation engineering and documentation.



Main instrumentation contractor



ABB has a proven track record as a main instrumentation contractor (MIC) to the oil, gas and petrochemical industries. Our approach leads to substantial benefits for both the EPC contractor and the end customer, and to significant savings in capital and operational expenditure.

Cutting capital and operational costs

There are numerous benefits and savings to be gained by selecting ABB as the main instrumentation contractor.

To begin with, it means that ABB takes full responsibility for the entire instrumentation project. We provide a complete solution comprising standardized ABB and third-party instruments, as well as front end engineering and design (FEED), product selection and procurement, interface engineering and complete documentation. This reduces the risk level and shortens the delivery time for the contractor. It ensures that the specifications are correct from the start, and eliminates the high fault rate that comes from using multiple vendors.

It also reduces operational and life cycle costs for the end customer. Spare part stocks and maintenance are reduced through the use of standardized devices with diagnostic features to enable predictive maintenance. ABB also provides a broad selection of service packages via its extensive global service network for oil and gas instrumentation.

Project benefits

- Reduced CAPEX (about 20%)
- Reduced risk
- Reduced delivery time
- Single point of contact and single point of responsibility
- Fault rate minimized
- Correct specifications ensured

Operational benefits

- Reduced OPEX (about 20%)
- Correct specifications ensured
- Standardized instruments reduce spare part stocks
- Predictive maintenance increases uptime
- Complete documentation provided
- Lower life cycle costs

Project profile: Al Shaheen Oil Field, Qatar

Customer: Sime Darby Engineering, Malaysia

Scope of supply: EIT

Completion: 2009

The Al Shaheen Oil Field is operated by Maersk Oil Qatar. It lies 180 km north of Doha and produces 300,000 barrels of oil a day.

Sime Darby Engineering was awarded a contract in 2007 to construct two new platforms for the existing offshore platform complex. The company selected ABB to provide an integrated electrical, instrumentation and telecommunications (EIT) solution.

The two platforms – one for utilities, the other for production - add 60 MW of power generation, 5,000 m³/h of treated water for water injection, and a new control room for the production process and platform complex.

ABB provided electrical equipment, instrumentation and telecommunications systems for the two platforms. The instrumentation consists of around 2,000 ABB and third-party standardized devices. ABB was also responsible for FEED and for interface engineering with the existing process automation system.

Specialist solutions

Feasibility

Design

Procurement

Commissioning

Service

Specialist applications like gas analysis and wireless instrumentation require specialist skills and expertise. ABB has long prioritized these highly specialized fields and is a leading provider of specialist solutions and cutting-edge technologies for these applications.

Specialist skills and cutting-edge technologies

Larger EICT and MIV projects often contain smaller sub-projects that require specialist expertise. ABB prioritizes these specialized areas and has many engineers with the requisite skills to deliver state-of-the-art solutions for both greenfield projects and retrofits.

Our fields of focus include:

- Metering solutions
- Gas analysis and gas chromatography
- Wireless instrumentation
- High integrity pressure protection systems (HIPPS)

We take responsibility for the full scope of work – from feasibility studies to front end engineering and design, procurement and commissioning. We have TÜV certified functional safety engineers to ensure SIL compliance in HIPPS and other safety projects. We are the world leader in gas analysis, and our global center of oil and gas instrumentation in Denmark specializes in developing new technologies and solutions for all four focus areas. Once the project is up and running, we provide service to ensure that the solution performs optimally throughout its life cycle.



Project profile: Tyra East, North Sea

Customer: Maersk Oil

Scope of supply: Complete wireless instrumentation solution

Completion: 2013

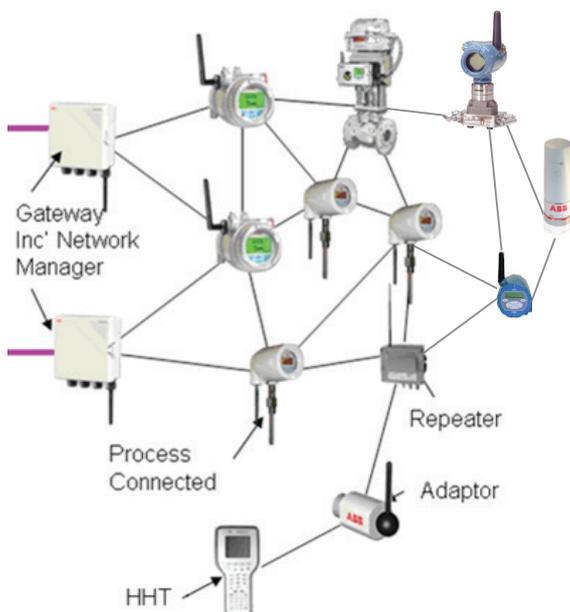
The Tyra Field is the largest gas condensate field in the Danish sector of the North Sea. Operated by Maersk Oil, the field has two production complexes – Tyra East and Tyra West. Tyra East processes oil and gas from its own and several other nearby fields.

Maersk Oil required a wireless instrumentation solution for the blowdown valves on the Tyra East platform. This is the first wireless instrumentation project that Maersk Oil has undertaken, so a proven supplier that could offer a complete wireless solution was of importance.

ABB is supplying a complete solution comprising site survey, design and engineering, specifications and documentation, installation and commissioning, and integration with the platform process control system.

Project completion is scheduled for mid-2013.

WirelessHART



Instrumentation products

ABB and its heritage companies have been market and technology leaders in instrumentation for more than 100 years. Our products are used all over the world and in the most demanding applications – from measuring chemicals and gas in the atmosphere of Mars to monitoring flow, pressure and temperature at extreme depths in subsea wellheads.

A comprehensive portfolio of world-class products

ABB offers an unparalleled portfolio of measurement products and solutions for all stages of upstream and downstream production. Our products combine high performance with the lowest cost of ownership, enabling our customers to operate their production assets safely, reliably, productively and profitably.

ABB's global reach means we can provide instruments and expertise wherever they are needed. Customers anywhere in the world are assured of on-time delivery and expert support for their instrumentation, enabling them to meet their deadlines, budgets and productivity targets.

ABB measurement products are based on common technology, providing a common look and feel and method of operation. As a result our products are easy to configure, easy to integrate and easy to maintain.

Our portfolio covers the following applications:

- Flow measurement
- Temperature measurement
- Pressure measurement
- Analytical measurement
- Level measurement
- Valve automation

ABB's R&D teams and factories are continuously improving and developing our portfolio for the oil and gas market.



1. Differential pressure transmitters with remote seals 2. Differential pressure transmitter 3. Thermowell 4. Temperature sensor with integrated transmitter 5. Magnetic level gauge 6. Variable area flowmeter (rotameter) 7. Intelligent electro-pneumatic valve positioner 8. Coriolis mass flow- and density meter

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